Motiv Emot (2015) 39:448–457
DOI 10.1007/s11031-014-9456-8

ORIGINAL PAPER

Regularity of daily activities buffers the negative impact of low perceived control on affect

Caitlan A. Tighe · Natalie D. Dautovich · Rebecca S. Allen

Published online: 3 December 2014

Abstract The main objective of the present study was to examine the potential buffering effect of regularity of the duration of time spent on daily activities in the association between perceived control and affect in community-dwelling adults. The sample for the current study was derived from the Midlife in the United States longitudinal follow-up study, MIDUS-II. Findings corroborated the association between a general sense of perceived control and positive and negative affect. Further, daily regularity was found to moderate the relationships of perceived control and both positive and negative affect. In each case, the findings suggest that individuals who scored lower on perceived control measures were more likely to have better affective outcomes when they demonstrated greater regularity in daily activities. The findings imply the relevance of regularity to affective experiences.

Keywords Perceived control · Affect · Regularity

Introduction

Perceived control, or the extent to which an individual believes in his or her ability to influence outcomes, has been empirically associated with the experience of affect. Specifically, an increased sense of control is associated with increased positive and decreased negative affect (Bye and Pushkar 2009). Although there is research to substantiate this association, less is known about additional variables that may influence this relationship (Lachman et al. 2011; Skinner 1995). Therefore, the main objective of the present study was to examine the potential moderating effect of regularity, defined as day-to-day variability in the duration of time spent on daily activities, in the association between perceived control and affect. This aim was accomplished through an archival analysis of the Midlife in the United States (MIDUS) follow-up dataset, MIDUS-II.

Perceived control represents the belief that desired outcomes can be regulated or influenced by one's own actions. It is conceptualized as the learned view of a competent self and a responsive environment and, as such, is susceptible to change across time and life domains (Skinner 1996). Perceived control has been linked to both physical (e.g., cortisol responses; Bollini et al. 2004) and mental (e.g., anxiety; Lachman et al. 2011) health and, therefore, is an important factor to examine. In the present study, perceived control is considered in relation to affect. The social determination theory provides theoretical support for the association between perceived control and affect. Social determination theory proposes a human need or desire for competence, or the experience of oneself as effective in dealing with the environment. When achieved, this experience is associated with a sense of well-being (Deci and Ryan 2000; Sheldon et al. 2001). In a general sense, when an individual perceives that desired outcomes are contingent on his or her own behavior or actions, there is a tendency to experience more competence, which may be experienced as positive affect. Conversely, when outcomes are perceived to be non-contingent on an individual's behavior, there is a tendency to experience negative affect, which may be representative of

C. A. Tighe (✉) · N. D. Dautovich
Department of Psychology, University of Alabama, 356B Gordon Palmer Hall, 505 Hackberry Lane, Tuscaloosa, AL 35487-0348, USA
e-mail: catighe@crimson.ua.edu

R. S. Allen
Center for Mental Health and Aging/Department of Psychology, University of Alabama, 248A Gordon Palmer Hall, 505 Hackberry Lane, Tuscaloosa, AL 35487-0348, USA

incompetence (Skinner 1996). At this point in time, there has been a great deal of attention focused on the direct relationship between perceived control and affect (e.g., Bookwala and Fekete 2009; Bye and Pushkar 2009; DeNeve and Cooper 1998; Windsor and Anstey 2010). However, this association may be influenced by additional personal and environmental circumstances.

Dysregulation of daily activities is one variable that has been implicated in numerous health outcomes, including the experience of affective episodes, and may influence the association of perceived control and affect (Ehlers et al. 1988; Grandin et al. 2006). Throughout each day, the daily activities in which individuals engage (e.g., meal times, physical activity, etc.) serve as social time cues that collectively comprise their social rhythms. According to the social zeitgeber theory (Ehlers et al. 1988), an individual's social rhythm exerts influence on his/her biological rhythms. As such, disruption of these daily social rhythms can result in the subsequent disruption of biological rhythms, which has been implicated in the experience of affective episodes (Ehlers et al. 1988; Wirz-Justice et al. 2009).

Empirically, much of the current literature on regularity of daily activities has focused on the detrimental impact of rhythm disruption, where decreased regularity has been associated with increased levels of depressive symptoms in individuals who have recently experienced stressful life events (e.g., bereavement) or those who meet the criteria for depressive disorders (Prigerson et al. 1994). However, Monk et al. (1997) propose a model wherein having a more regular lifestyle may contribute to greater well-being. Based on this model, having a more regular lifestyle (i.e., the consistent allocation of time spent on daily activities) promotes event predictability, which in turn promotes better mood (Monk et al. 1997). Predictability and perceived control are distinct, but complementary constructs. Therefore, event predictability may offset the negative effects of having low perceived control. A more regular lifestyle may also contribute to greater circadian entrainment, which is proposed to facilitate the experience of increased affective well-being (Monk et al. 1997).

Few studies have examined rhythm stability as a factor contributing to the maintenance of affective well-being, or as a protective factor against negative psychological outcomes. Notably, Ivanova and Israel (2005) identified the moderating role of regularity in daily activities and events in the relation between pessimistic attributional style and depressive symptoms in a sample of college students. Specifically, for individuals who were more regular in their daily life, a pessimistic attributional style (e.g., attributing negative events to internal causes and positive events to external causes) was not as strongly negatively related to depressive symptoms as it was for those who were less regular. These findings suggest that regularity may serve as a buffer against the influence of attributional style. Although the constructs examined are not identical to those in the proposed study, the findings lend theoretical and empirical support for a conceptual model where regularity of daily activities moderates the relation between views of the self and affective outcomes (Ivanova and Israel 2005). However, because the sample consisted of younger adults ranging in age from 17 to 23 years, the generalizability of results to individuals across the lifespan is limited. Additionally, regularity was measured using a Likert-type scale on which participants rated their perceived regularity in daily activities, which presents a subjective measure of regularity. As such, the present study aims to more clearly elucidate this conceptual model by sampling individuals from an age-range that spans adulthood, as well as by using prospective measures of regularity.

This study extends current research on perceived control and affect in adults by assessing the potential moderating role of regularity of daily activities. Specifically, the study aims to examine if: (1) the construct of overall perceived control independently predicts positive affect and negative affect, (2) regularity predicts positive and negative affect, and (3) the relationship between overall perceived control and positive and negative affect varies by regularity in duration of daily activities.

Based on the above-mentioned research and on the Monk et al. (1997) conceptual model of lifestyle regularity as it relates to well-being, it was hypothesized that perceived control would positively predict positive affect and negatively predict negative affect. Regularity was hypothesized to predict positive and negative affect with higher levels of regularity predicting greater positive affect and lower levels predicting greater negative affect. Finally, it was hypothesized that increased regularity would buffer the effects of low perceived control on positive and negative affect.

Methods

Participants

The sample of interest for the current study was derived from those individuals who completed both Project 1 (follow-up of MIDUS-I demographic information and psychological constructs) and Project 2 (National Study of Daily Experiences-II; NSDE-II) of MIDUS-II, the second-wave of a nationally representative study of community-dwelling adults (Ryff amd Almeida 2010). Participants were selected utilizing random digit dialing from working telephone banks in the United States. Only those participants who completed perceived control measures, affect measures, and at least 7 days of daily activity data, where engagement in a minimum of three activities was endorsed

at least twice during the 7-day period, were included in the study. The final sample consisted of 1,548 participants.

Participants ranged in age from 33 to 84 years old ($M = 56.93$, $SD = 12.06$). The majority of the sample were female (56.9 %), white (93.0 %), currently married (73.0 %) and reported completing at least 1–2 years of college (70.7 %). On average, participants self-rated as being in good health ($M = 2.35$, $SD = .99$), on a Likert-type scale where 1 is excellent and 5 is poor. Complete descriptive statistics are listed in Table 1.

Procedures

Data collection for MIDUS-II, Project 1 occurred through structured telephone interviews and mail surveys. Measures of demographics, perceived control, and positive and negative affect were embedded within the Project 1 self-administered questionnaires, which were sent by mail and, once completed, were returned by mail.

Data collection for the NSDE-II occurred in "flights" of interviews with each flight consisting of approximately 20 participants. Individual flights were conducted at varying times in the calendar year to allow for consideration of seasonal variation in daily experiences. Participants completed structured telephone interviews about their daily experiences for eight consecutive days. Data for all measures of interest were self-reported by each participant.

Table 1 Participant demographics

Variable	Statistic
M (*SD*) age (years)	56.93 (12.06)
Gender (%) female	56.9
Race (%)	
White	93.0
African American	2.5
Native American or Alaska Native	1.4
Asian	.3
Other	2.9
Marital status (%)	
Currently married	73.0
Separated	1.6
Divorced	11.4
Widowed	7.0
Never married	7.0
Highest level of education (%)	
Junior high school	1.0
High school	28.3
At least 1–2 years college	70.7
M (*SD*) health	2.35 (.99)

Health was calculated from a Likert-type scale where respondents self-rated their physical health, where 1 = *excellent* and 5 = *poor*

Measures

Demographic information

Participants self-reported age, sex, physical self-rated health, highest level of education completed, current marital status (married, separated, divorced, widowed, or never married), and race (White, African American, Native American, Asian, Native Hawaiian or Pacific Islander, or other) on the self-administered questionnaires that were sent via mail. Since the majority of the sample identified as married and as White, and because these were not variables of primary interest for the current study, both marital status and racial origins were dichotomized (i.e., married/non-married, White/Other), to promote parsimonious models for statistical analysis. Based on their potentially differential associations with affect, the following covariates were included in the models: age, sex, race, marital status, self-rated health, and years of education (Steptoe et al. 2011).

Perceived control

Overall perceived control was measured by combining items from personal mastery and perceived constraints scales, for a total of 12 items. The mastery scale is comprised of four questions that measure an individual's beliefs about his or her ability to carry out goals (e.g., "what happens to me in the future mostly depends on me"). Two items were created by Lachman and Weaver (1998) and two items were drawn from Pearlin and Schooler's Mastery Scale (1978). The perceived constraints scale is comprised of eight total items that measure the extent to which an individual believes in the potential for uncontrollable factors to interfere with goal achievement (Lachman and Weaver 1998; e.g., "there are many things that interfere with what I want to do"). Five items were drawn from Pearlin and Schooler's mastery scale (1978) and three items were created by Lachman and Weaver (1998).

Responses to all prompts were rated on a 7-point Likert scale (1 = *strongly agree* and 7 = *strongly disagree*). Scale scores were constructed by calculating the mean of the respective items. Overall perceived control scores were constructed by calculating the mean across all items, with higher scores representing higher levels of perceived control. Cases were excluded if responses were missing from at least half of each scale. The overall measure of perceived control (Cronbach's $\alpha = .68$) demonstrated adequate internal reliability in NSDE-II sample. Additionally, the convergent validity of the measure items was previously demonstrated through an analysis of factor loadings indicating that the items derived from Pearlin and Schooler

(1978) and Lachman and Weaver (1998) each loaded properly onto their respective scales (Lachman and Weaver 1998). Although domain-specific measures may be more sensitive to identifying relationships in specific life domains, a generalized measure of control was used in MIDUS-II, given the range of domains being assessed in the larger study (Lachman and Weaver 1998).

Regularity

The current study utilized data from the daily experiences interview which was modified for use in NSDE-II and is comprised of stem and open-ended questions to collect information on daily physical and psychological health, as well as daily experiences. The items of interest asked participants how much time was spent on various activities in the preceding 24 h. Based on their similarity to social rhythm activities that have previously been associated with mood outcomes (Ashman et al. 1999; Monk et al. 1991), the following specific activities were selected for inclusion in the present conceptualization of daily regularity: sleeping, caring for children, doing chores, working, watching television, giving unpaid assistance, participating in leisure activities, engaging in physical activities, and volunteering. To calculate a composite regularity variable, intraindividual standard deviations (ISDs) were calculated for each individual across each response variable (e.g., time spent sleeping). First, the duration of time spent each day on each activity was de-trended to remove the effects of time, leaving only the residuals for each variable. These residuals were then used to calculate ISDs for each response variable, to determine the extent to which an individual varied around his/her own mean. De-trending the data prior to the calculation of the ISDs for each response variable ensured that the ISDs represent pure variability. The ISDs for each response variable were then averaged to produce a continuous, composite regularity score.

Although the study was designed to collect data over 8 days, the composite regularity variable was derived from 7 days of data. Seven days of data provides an estimate of regularity over the equivalent of 1 week while still capturing changes in routine that occur from weekdays to weekend. In summary, regularity was operationally defined as the composite amount of intraindividual variability in the duration of endorsed daily activities, over 7 days, where greater variability indicates less regularity. Composite variables were derived if the participant endorsed engagement in a minimum of three activities at least twice during the 7-day period.

Positive and negative affect

Measures of positive and negative affect were developed for MIDUS-II from pre-established and validated scales including the Positive and Negative Affect Scales (Watson and Tellegen 1985) and the Affect Balance Scale (Bradburn 1969). The positive affect scale was comprised of 13 items querying participants about how much of the time during the past 30 days that they felt: cheerful, in good spirits, extremely happy, calm and peaceful, satisfied, close to others, full of life, enthusiastic, attentive, proud, confident and active. All responses were rated on a 5-point Likert scale (1 = *all of the time* and 5 = *none of the time*). Items were recoded so that higher scores indicated greater positive affect. A positive affect score was calculated by summing scores on each of the items. This measure demonstrates high internal reliability based on the NSDE-II sample (Cronbach's $\alpha = .94$).

Negative affect was assessed using a negative affect scale which consisted of 14 items to which participants indicated responses on a 5-point Likert scale (1 = *all of the time* and 5 = *none of the time*). Items asked participants about how much of the time during the past 30 days that they felt: so sad nothing could cheer you up, nervous, restless, hopeless, that everything was an effort, worthless, lonely, afraid, jittery, irritable, ashamed, angry, and upset. Items were recoded so that higher scores represented greater negative affect. A negative affect score was calculated by summing scores on each of the 14 items. This measure of negative affect demonstrates good internal reliability in the NSDE-II sample (Cronbach's $\alpha = .95$).

Results

Statistical significance was set at the .05 probability level with results reported from SPSS version 20. In the present analyses, the largest number of predictors in any one regression model was nine. For a multiple regression analysis with nine predictors, predicting an effect size of at least .02, at an alpha level of .05, a sample size of 1,548 yields a power of approximately .98 (Faul et al. 2007). Thus, there was sufficient power to detect small effect sizes with the current sample and analyses. Preliminary analyses indicated that all assumptions for multiple regression analyses were met.

Summary of analyses

Two separate, multi-tiered regression analyses using the product term analysis method were used to test the hypotheses that variability in the duration of daily activities moderates the relationship between overall perceived control and positive and negative affect, respectively (Frazier et al. 2004). In the first step, six covariate variables were entered: age, sex, health, education, marital status, and race. For the second step, the standardized predictor

variable, perceived control, was added to the model. In the third step, the standardized moderator variable, composite regularity, was added. In the final step, the product term reflecting the interaction of perceived control and regularity was added to the model. Two additional regression analyses were used to test the direct effect of regularity on positive and negative affect, without controlling for the effect of perceived control. Covariates were entered in step 1, the standardized composite regularity variable was entered in step 2, the standardized perceived control variable was entered in step 3, and the regularity by control interaction term was entered on step 4.

Perceived control and regularity predicting positive affect

The adjusted R^2, unstandardized beta weights, beta weight standard errors, and the standardized beta weights for the model predicting positive affect are reported in Table 2. R was significantly different from zero at the end of each step. After step 1, with the covariates included in the equation, $R^2 = .16$, F_{inc} (6, 1,538) = 49.24, $p < .001$. Age, self-rated health, marital status, and race were significant predictors. The entry of overall perceived control in step 2 explained an additional 17.5 % of variance, $R^2 = .34$, F_{inc} (1, 1,537) = 406.58, $p < .001$. Perceived control was a significant predictor. The addition of the regularity variable to the equation in step 3 did not produce reliable improvements in R^2, and the regularity variable was not a significant predictor ($p = .49$). However, the addition of the perceived control by regularity interaction term in step 4 significantly explained an additional .3 % of unique variance, $R^2 = .34$, F_{inc} (1, 1,535) = 6.50, $p = .01$, demonstrating a small effect size, Cohen's $f^2 = .005$. The regularity by sense of control interaction term significantly predicted positive affect.

To further understand the relation between control, regularity, and positive affect, we sampled two levels of the regularity moderator variable at approximately 1 standard deviation below the average variability in daily activities (low) and 1 standard deviation above the average variability in daily activities (high). The remaining figure in the document utilizes the same method of depiction with the dependent variable changed, accordingly. As depicted in Fig. 1, more perceived control is associated with more positive affect, across the sample. The significant interaction term suggests that at low levels of perceived control, individuals who are more regular report greater positive affect than those who are less regular. At high levels of perceived control, greater regularity was associated with slightly less positive affect. Further, older age, better self-rated health, being married, identifying as White, and

Table 2 Regression analyses predicting positive affect by covariates, perceived control, regularity, and a perceived control by regularity interaction term

Step 1	$\Delta R^2 = .16$**			Step 2	$\Delta R^2 = .18$**			Step 3	$\Delta R^2 = .00$			Step 4	$\Delta R^2 = .003$*		
	B	SE *B*	β		*B*	SE *B*	β		*B*	SE *B*	β		*B*	SE *B*	β
Age	.16	.02	.22**	Age	.15	.02	.21**	Age	.15	.02	.21**	Age	.15	.02	.21**
Sex	.22	.41	.01	Sex	.70	.37	.04	Sex	.70	.37	.04	Sex	.71	.37	.04
Health	−3.15	.21	−.36**	Health	−1.99	.20	−.23**	Health	−1.99	.20	−.23**	Health	−2.00	.20	−.23**
Education	−.03	.08	−.01	Education	−.14	.08	−.04	Education	−.14	.08	−.04	Education	−.14	.08	−.04
Marital status	1.37	.46	.07*	Marital Status	1.02	.41	.05*	Marital Status	1.02	.41	.05*	Marital Status	.97	.41	.05*
Race	−2.54	.79	−.08*	Race	−2.42	.71	−.07*	Race	−2.43	.71	−.07*	Race	−2.47	.71	−.07**
				Perceived Control	3.83	.19	.44**	Perceived Control	3.83	.19	.44**	Perceived Control	3.80	.19	.44**
								Regularity	.13	.18	.02	Regularity	.14	.18	.02
												Regularity by Control	.43	.17	.05*

Health refers to participant self-rated physical health, where higher scores indicated worse health, marital status refers to married or non-married, and education indicates highest level of education obtained

* $p < .05$; ** $p < .001$

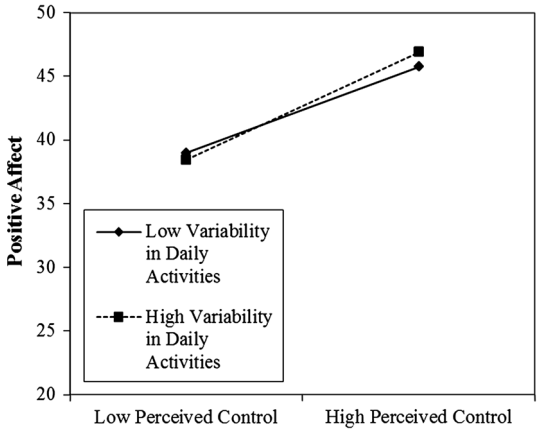

Fig. 1 Significant regularity interaction term in the relationship between perceived control and positive affect. The regularity moderator variable was sampled at 1 standard deviation below the average variability in daily activities (*low*) and 1 standard deviation above the average variability in daily activities (*high*)

having an increased sense of control were associated with greater positive affect.

For the model testing the unique effect of regularity on positive affect, without controlling for the effect of perceived control, R was significantly different from zero at the end of each step. However, the entry of the regularity variable in step 2 did not result in a reliable increase in R^2 and regularity was not a significant predictor of positive affect ($p = .46$). Further, regularity did not emerge as a unique predictor in step 3 ($p = .49$) or step 4 ($p = .42$).

Perceived control and regularity predicting negative affect

For the model predicting negative affect, R was significantly different from zero at the end of all four steps (see Table 3). After step 1, the addition of covariates explained 15.6 % of variance, $R^2 = .16$, F_{inc} (6, 1538) = 47.40, $p < .001$. Age, health, and marital status were significant predictors. The entry of overall perceived control in step 2 resulted in a 14.5 % increment in R^2, $R^2 = .30$, F_{inc} (1, 1537) = 318.10, $p < .001$. Perceived control was a significant predictor. Step 3 did not account for any reliable improvements in R^2. The addition of the regularity by perceived control interaction term in the final step (step 4) accounted for an additional .3 % of variance, $R^2 = .31$, F_{inc} (1, 1535) = 5.88, $p = .02$, and exhibited a small effect size, Cohen's $f^2 = .004$. The regularity by perceived control interaction term was a significant predictor.

For this model, greater age, better health, being married, and greater perceived control were predictive of less negative affect. Additionally, the significant interaction term indicates that the negative relationship between perceived control and negative affect is stronger for those who are

Table 3 Regression analyses predicting negative affect by covariates, perceived control, regularity, and a perceived control by regularity interaction term

Step 1	$\Delta R^2 = .16$**			Step 2	$\Delta R^2 = .15$**			Step 3	$\Delta R^2 = .001$			Step 4	$\Delta R^2 = .003$*		
	B	SE *B*	β		*B*	SE *B*	β		*B*	SE *B*	β		*B*	SE *B*	β
Age	−.15	.01	−.26**	Age	−.14	.01	−.26**	Age	−.14	.01	−.25	Age	−.14	.01	−.25**
Sex	.72	.32	.05*	Sex	.38	.30	.03	Sex	.38	.30	.03	Sex	.37	.30	.03
Health	2.16	.17	.32**	Health	1.33	.16	.20**	Health	1.33	.16	.19**	Health	1.33	.16	.19**
Education	.00	.07	.00	Education	.08	.06	.03	Education	.08	.06	.03	Education	.08	.06	.03
Marital status	−1.01	.36	−.07*	Marital status	−.76	.33	−.05*	Marital status	−.76	.33	−.05*	Marital status	−.72	.33	−.05*
Race	.74	.62	.03	Race	.65	.57	.03	Race	.64	.57	.02	Race	.67	.57	.03
				Perceived control	−2.72	.15	−.40**	Perceived control	−2.72	.15	−.40**	Perceived control	−2.70	.15	−.40**
								Regularity	.23	.15	.03	Regularity	.22	.15	.03
												Regularity by control	−.33	.14	−.05*

* $p < .05$; ** $p < .001$

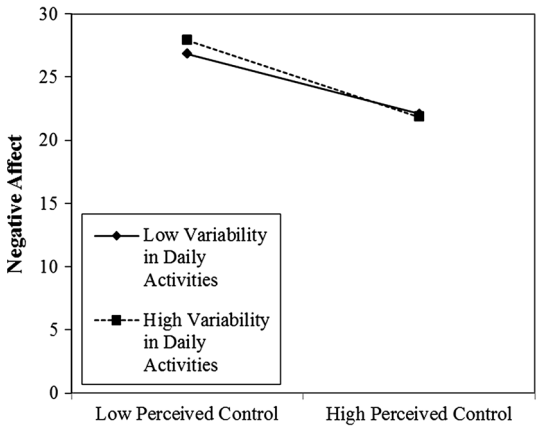

Fig. 2 Significant regularity interaction term the relationship between perceived control and negative affect. The regularity moderator variable was sampled at 1 standard deviation below the average variability in daily activities (*low*) and 1 standard deviation above the average variability in daily activities (*high*)

low in regularity, relative to those who demonstrate greater regularity (see Fig. 2). Of note, individuals who are more regular experience less negative affect at low levels of perceived control in comparison to those who are less regular.

For the model testing the effect of regularity on negative affect, beyond the effect of perceived control, R was significantly different from zero at the end of each step. The entry of the regularity variable in step 2 did not result in a reliable increase in R^2 and regularity was not a significant predictor of negative affect ($p = .19$). Regularity did uniquely predict negative affect in either step 3 ($p = .12$) or step 4 ($p = .14$).

Discussion

These findings extend prior research by demonstrating that regularity of daily activities was found to moderate the relationships of perceived control and both positive and negative affect. In each case, individuals who scored lower on perceived control were more likely to have positive affective outcomes when they demonstrated greater regularity in daily activities. Findings from the present study also corroborate the cross-sectional association between a general sense of perceived control and positive and negative affect, where decreased control is predictive of lower positive and greater negative affect. This relationship was present even when accounting for other influential demographic variables such as age, race, marital status, and health.

Regularity in the duration of time spent on daily activities did not uniquely predict positive or negative affect, beyond the effects of perceived control. Although a direct relationship between regularity and affect was anticipated (Monk et al. 1997), there are several factors that may have contributed to these relationships being non-significant. First, data was collected over 8 days, which gives a clear picture of how time spent on daily activities fluctuated on a daily basis, across 1 week. However, whereas circadian rhythms follow a 24-h cyclical period, other processes demonstrate circaseptan rhythms, which are cycles that vary over 7 day periods. So, it is possible that the timing of daily activities follows a circaseptan rhythm, where the variability from day-to-day is less meaningful than the variability occurring from week to week. That is to say, the examination of daily regularity over a week could have given an incomplete representation of regularity across greater time periods. An incomplete understanding of this regularity construct may have precipitated misrepresentation of regularity in relation to affect (which represented affect occurring over the preceding month). As such, the present study could have benefited from daily data collection occurring over a greater duration of time (e.g., 2 weeks) which would have enabled the identification of circaseptan rhythmicity.

Additionally, the inclusion of several follow-up questions may have offered insight into the relationship between regularity and affect. Specific questions might have asked participants to indicate if the time-span reported was typical and if the respondent has a preference for routine or regularity (e.g., a trait routinization questionnaire), in order to ascertain if the typicality of the daily activities or aversion to regularity may confound the relation of regularity to affect. An alternative explanation for the non-significant finding is that since regularity has primarily been studied as it relates to clinical levels of affective experiences (e.g., bipolar disorder; Ehlers et al. 1988), it is possible that the direct relationship between regularity and affect is not significant at subclinical levels. It is also possible that regularity of the timing of daily activities (i.e., the time activities were completed) is more strongly associated with affect than regularity in the amount of time spent on various daily activities. Unfortunately, data on the timing of daily activities was not collected in MIDUS-II.

Nonetheless, the present analyses suggest that regularity in daily activities moderates the association of overall perceived control with positive and negative affect, albeit accounting for a small amount of unique variance. Specifically, for those with lower perceptions of control, increased regularity in daily activities is associated with better affective outcomes than for those who are less regular. Consistent with Monk et al.'s (1997) model, regularity during daily activities may provide a psychological sense of stability that, in essence, weakens the relationship between perceived control and both positive and negative

affect. For example, respondents may report low levels of perceived control more broadly, but are exerting or experiencing control relative to a smaller, more specific portion of their life, the regularity of daily activities. At the psychological level, although perhaps it is not readily identified as an aspect of control, knowing that component activities of a day are predictable may ameliorate the effects of a low sense of control on experience of affect. At the circadian level, greater behavioral rhythmicity during the day and night may also be promoting a more positive affective experience.

One explanation for the small size of the significant interaction effects stems from the differentiation of perceived versus actual regularity in daily life. Whereas Ivanova and Israel (2005) identified regularity as a significant moderator in a similar conceptual model, respondents used a retrospective measure to report on stability in daily activities. The use of retrospective, self-report measures invites some degree of self-report bias, where individuals may misremember or misattribute the degree of actual regularity experienced. It is also possible that other factors (i.e., how frequently an activity occurs or mean levels of activity duration) may influence how an individual responds to questions about regularity. As such, retrospective reports may represent, to some extent, a perceived sense of regularity. The present study used a prospective report of regularity in daily activities, which is a more accurate representation of actual behavioral regularity. However, the ISD values representing regularity in the present study do not consider activity frequency, which may have contributed to the lower effect size seen in the present findings. Therefore, it is possible that perceived regularity is equally, or even more, important to consider relative to the association between perceived control and affect.

Limitations of the present study must be considered. Despite being a randomly selected sample, there was little variability in demographic characteristics (i.e., racial and ethnic diversity). Therefore, this study cannot reliably capture the hypothesized relations in minority populations. From a methodological standpoint, the study is limited by the domain-general measure of control. Domain-general measures of control are not the most precise form of measurement of an individual's experience of control, given that perceived control may vary across differing domains (e.g., cognition, health, etc.) Just as perceived control varies across situations, it also varies across time. Notably, an overall sense of perceived control may vary as frequently as from week to week (Eizenman et al. 1997) or day to day (Ong et al. 2005). Future studies would benefit from measuring control at a more specific level and on a more frequent time scale, to promote acquisition of the most precise self-reports of perceived control. Further, though the reliability of the present measure of perceived control is considered within an acceptable range, it would be advisable for future studies to utilize a more internally consistent measure of perceived control.

Similar to with single time-point measurement of perceived control, there may be additional error variance that resulted from measurement of affect over a month. Affect is a highly variable construct that fluctuates more frequently than from day-to-day, being variable even from moment to moment (Sliwinski et al. 2009). Future studies examining these constructs would benefit from utilizing measures on smaller and more congruent time scales (e.g., measuring control, regularity, and affect at the daily level). A final methodological limitation relates to the calculation of the regularity variable. Specifically, whereas prior measures of daily regularity (i.e., Social Rhythm Metric; Monk et al. 1991) have considered the timing of daily activities within a day, the MIDUS dataset only contained data on the amount of time spent on daily activities and not the time of day the activities were completed. Although this study would have benefited from this additional timing component, examination of variability in time spent on daily activities remains an important aspect of daily stability. The need to understand the unique functions of variability in timing versus time spent engaging in activities is corroborated in other literatures (e.g., sleep; Zisberg et al. 2010). Moreover, the significant associations of control, regularity of time spent on daily activities, and affect imply the need to consider multiple dimensions of daily regularity, including time spent on activities.

In summary, the present study demonstrated the associations of perceived control with positive and negative affect. The sample size of the present study was large and regularity moderated the effect of perceived control with positive and negative affect, but only with small effect sizes. Additional research is needed to understand the exact nature and function of regularity as it relates both to perceived control and affect, but this research is merited for numerous reasons. There is existing research indicating that perceived control is a psychological construct that can be enhanced through training methods such as cognitive restructuring (Tennstedt et al. 1998). Nonetheless, the identification of regularity as a protective factor for those experiencing low levels of perceived control offers an additional potential target for intervention when low perceived control may not be modifiable (e.g., the ability to cure a chronic illness). As a target of therapy, the regulation of daily activities offers several benefits. First, as a behavioral technique, it may be applied with individuals with compromised cognitive capacities and may also be a more plausible behavioral target for individuals who are not as psychologically-minded, or do not prefer cognitive treatment approaches. Further, regulation of daily activities

may naturally complement existing treatment approaches to mood disorders, such as behavioral activation, where engagement in reinforcing daily activities is promoted.

In conclusion, the presented results are promising. Future researchers would benefit from expounding on the current analyses by measuring control, regularity, and affect on the same time-scale. Moreover, measuring preference for regularity may yield a clearer picture of the relationship between these three variables.

References

Ashman, S. B., Monk, T. H., Kupfer, D. J., Clark, C. H., Myers, F. S., Frank, E., et al. (1999). Relationship between social rhythms and mood in patients with rapid cycling bipolar disorder. *Psychiatry Research*, *86*(1), 1–8. doi:10.1016/S0165-1781(99)00019-0.

Bollini, A. M., Walker, E. F., Hamann, S., & Kestler, L. (2004). The influence of perceived control and locus of control on the cortisol and subjective responses to stress. *Biological Psychology, 67*(3), 245–260. doi:10.1016/j.biopsycho.2003.11.002.

Bookwala, J., & Fekete, E. (2009). The role of psychological resources in the affective well-being of never-married adults. *Journal of Social and Personal Relationships, 26*(4), 411–428. doi:10.1177/0265407509339995.

Bradburn, N. M. (1969). *The structure of psychological well-being*. Chicago: Aldine.

Bye, D., & Pushkar, D. (2009). How need for cognition and perceived control are differentially linked to emotional outcomes in the transition to retirement. *Motivation and Emotion, 33*(3), 320–332. doi:10.1007/s11031-009-9135-3.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268. doi:10.1207/S15327965PLI1104_01.

DeNeve, K. M., & Cooper, H. (1998). The happy personality: a meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin, 124*(2), 197–229. doi:10.1037/0033-2909.124.2.197.

Ehlers, C. L., Frank, E., & Kupfer, D. J. (1988). Social zeitgebers and biological rhythms—A unified approach to understanding the etiology of depression. *Archives of General Psychiatry, 45*(10), 948–952. doi:10.1001/archpsyc.1988.01800340076012.

Eizenman, D. R., Nesselroade, J. R., Featherman, D. L., & Rowe, J. W. (1997). Intraindividual variability in perceived control in a older sample: The MacArthur successful aging studies. *Psychology and Aging, 12*(3), 489.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191. doi:10.3758/BF03193146

Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology, 51*(1), 115. doi:10.1037/0022-0167.51.1.115

Grandin, L. D., Alloy, L. B., & Abramson, L. Y. (2006). The social zeitgeber theory, circadian rhythms, and mood disorders: Review and evaluation. *Clinical Psychology Review, 26*(6), 679–694. doi:10.1016/j.cpr.2006.07.001.

Ivanova, M. Y., & Israel, A. C. (2005). Family stability as a protective factor against the influences of pessimistic attributional style on depression. *Cognitive Therapy and Research, 29*(2), 243–251. doi:10.1007/s10608-005-3167-0.

Lachman, M. E., Neupert, S. D., & Agrigoroaei, S. (2011). The relevance of control beliefs for health and aging. *Handbook of the psychology of aging, 7*, 175–190.

Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology, 74*, 763–773. doi:10.1037/0022-3514.74.3.763.

Monk, T. H., Kupfer, D. J., Frank, E., & Ritenour, A. M. (1991). The Social Rhythm Metric (SRM): Measuring daily social rhythms over 12 weeks. *Psychiatry Research, 36*(2), 195–207. doi:10.1016/0165-1781(91)90131-8.

Monk, T. H., Reynolds, C. F., Kupfer, D. J., Hoch, C. C., Carrier, J., & Houck, P. R. (1997). Differences over the life span in daily life-style regularity. *Chronobiology International, 14*(3), 295–306. doi:10.3109/07420529709001421.

National Survey of Midlife Development in the United States (MIDUS II), 2004–2006. ICPSR04652-v6. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-04-18. doi:10.3886/ICPSR04652.v6.

Ong, A. D., Bergeman, C. S., & Bisconti, T. L. (2005). Unique effects of daily perceived control on anxiety symptomatology during conjugal bereavement. *Personality and Individual Differences, 38*(5), 1057–1067. doi:10.1016/j.paid.2004.07.004.

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*, 2–21.

Prigerson, H. G., Reynolds, C. F, III., Frank, E., Kupfer, D. J., George, C. J., & Houck, P. R. (1994). Stressful life events, social rhythms, and depressive symptoms among the elderly: An examination of hypothesized causal linkages. *Psychiatry Research, 51*(1), 33–49. doi:10.1016/0165-1781(94)90045-0.

Ryff, C. D., & Almeida, D. M. (2010). National Survey of Midlife in the United States (MIDUS II): Daily Stress Project, 2004–2009. ICPSR26841-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2010-02-26. doi:10.3886/ICPSR26841.v1.

Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology, 80*, 325–339. doi:10.1037//O022-3514.80.2.325.

Skinner, E. A. (1995). *Perceived control, motivation, and coping*. Thousand Oaks, CA: Sage.

Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71*(3), 549–570. doi:10.1037/0022-3514.71.3.549.

Sliwinski, M. J., Almeida, D. M., Smyth, J., & Stawski, R. S. (2009). Intraindividual change and variability in daily stress processes: findings from two measurement-burst diary studies. *Psychology and Aging, 24*(4), 828. doi:10.1037/a0017925.

Steptoe, A., Leigh, E. S., & Kumari, M. (2011). Positive affect and distressed affect over the day in older people. *Psychology and Aging, 26*(4), 956–965. doi:10.1037/a0023303.

Tennstedt, S., Howland, J., Lachman, M. E., Peterson, E. W., Kasten, L., & Jette, A. (1998). A randomized, controlled trial of a group intervention to reduce fear of falling and associated activity restriction in older adults. *Journals of Gerontology: Psychological Sciences, 53B*, P384–P392. doi:10.1093/geronb/53B.6.P384.

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin, 98*, 219–235. doi:10.1037/0033-2909.98.2.219.

Windsor, T. D., & Anstey, K. J. (2010). Age differences in psychosocial predictors of positive and negative affect: A longitudinal investigation of young, midlife, and older adults. *Psychology and Aging, 25*(3), 641–652. doi:10.1037/a0019431.

Wirz-Justice, A., Bromundt, V., & Cajochen, C. (2009). Circadian disruption and psychiatric disorders: The importance of entrainment. *Sleep Medicine Clinics, 4*(2), 273–284. doi:10.1016/j.jsmc.2009.01.008.

Zisberg, A., Gur-Yaish, N., & Shochat, T. (2010). Contribution of routine to sleep quality in community elderly. *Sleep, 33*(4), 509.