PERCEIVED CONTROL AND AFFECT: THE INFLUENCE OF REGULARITY IN THE DURATION OF TIME SPENT ON DAILY ACTIVITIES

by

CAITLAN TIGHE

NATALIE DAUTOVICH, COMMITTEE CHAIR
REBECCA ALLEN
JASON PARTON

A THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Arts
in the Department of Psychology
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2014

ABSTRACT

Low perceived control is associated with adverse physical and mental health outcomes. As such, the main objective of the present study was to examine the relationship between perceived control, and its component parts, personal mastery and perceived constraints, with affect in community-dwelling adults. Additionally, the potential buffering effect of a third variable, regularity of the duration of time spent on daily activities, was examined. The sample for the current study was derived from the Midlife in the United States longitudinal follow-up study, MIDUS-II. Findings corroborated the relationship 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, as well as perceived constraints and positive and negative affect. In each case, the findings suggest that individuals who scored lower on perceived control or higher on perceived constraints measures were more likely to have positive affective outcomes when they demonstrated greater regularity in daily activities. Implications of the findings are discussed.

Keywords: perceived control, affect, regularity

DEDICATION

This thesis is dedicated to my parents and my sister who always keep me well-grounded.

LIST OF ABBREVIATIONS AND SYMBOLS

α	Cronbach's alpha; index of internal consistency
df	Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data
M	Mean: the sum of a set of measurements divided by the number of measurements in the sample
SD	Standard deviation: the square root of the variance of the sample
p	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
r	Pearson correlation
R^2	The square of the sample correlation; coefficient of determination
B	Unstandardized beta weight associated with a variable
β	Standardized beta weight associated with a variable
t	Computed value of *t* test
<	Less than
=	Equal to

ACKNOWLEDGEMENTS

I feel very fortunate to have had the support of faculty members, colleagues, and friends as I worked on this research project. I am particularly thankful for the support of Dr. Natalie Dautovich, my research mentor and the chair of this thesis. I very much appreciate her total support and thoughtful guidance during this process, and since starting graduate school. I would also like to thank my committee members, Dr. Rebecca Allen and Dr. Jason Parton, who were both accommodating, as well as very open to imparting knowledge relating to their respective areas of expertise. Finally, I would not have been able to complete this project without the support of my parents who have always believed in me, my sister who encourages me in all of my endeavors (and provides emotional support along the way), and, finally, my friends who are always there to make sure I keep my work and school life balanced.

I would also like to express gratitude to the multidisciplinary team of scholars who developed the Midlife in the United States studies, as well as the National Institute on Aging whose funding made it possible to conduct a longitudinal follow-up of the MIDUS-I investigation.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Perceived Control and Affect: The Influence of Regularity in the Duration of Time Spent on Daily Activities

Since the development of Rowe and Kahn's (1997) model of successful aging, there has been an increasing amount of attention devoted to understanding factors that contribute to physical and psychological well-being in adulthood, as well as the preventative and interventional efforts that may be developed to promote these healthy states. According to U.S. Census Bureau (2005) projections, between the years 2003 and 2030, the older adult population in the United States will almost double in size and increase in population composition from 12 to 20 percent. To better understand the impact and course of mental health across middle and into older adulthood, the notion of well-being has been proposed for consideration to inform public policy (U.S. National Institute on Aging [NIA] and U.K. Science and Innovation Network, 2010). Specifically, there is a proposed need to expand the research on the factors that determine, or contribute to, the maintenance of well-being.

Subjective well-being has been conceptualized as one's cognitive and affective evaluations of life (Diener, 2000). Affect, one factor contributing to a sense of well-being, is a complex construct that influences and is influenced by a multitude of factors. Consequently, if affective experiences are more frequently negative than positive, they may have detrimental effects on an individual's sense of well-being. 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 & Pushkar, 2009). Although there is research to substantiate this association, less is known about the additional variables that may influence this relationship (Lachman, Neupert, & Agrigoroaei, 2011; Skinner, 1995). Therefore,

the main objective of the present study was to examine the relationship between perceived control and affect in community-dwelling adults, as well as to examine the potential moderating effect of a third variable, regularity of the duration of time spent on daily activities. This aim was accomplished through an archival analysis of the Midlife in the United States (MIDUS) longitudinal 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). In addition to being considered in a more general sense, perceived control has been conceptualized as being comprised of two component parts: personal mastery and perceived constraints (Lachman & Weaver, 1998; Skinner, 1996). Personal mastery indicates an individual's perceived effectiveness in achieving goals, whereas perceived constraints refers to the belief that there are obstacles beyond one's control that obstruct goal achievement (Lachman & Weaver, 1998).

At present, there is longitudinal and cross-sectional research to suggest that transitions from middle to older adulthood are associated with decreases in overall perceived control, where personal mastery remains relatively constant but the perception of constraints increases with age (Lachman, 2006; Lachman et al., 2011; Lachman & Firth, 2004). The research suggesting that perceived constraints increases with age aligns with the notion that perceived control is a learned view that may be impacted by perceptions of physical, psychological, and environmental constraints associated with aging (Lachman et al., 2011; Lachman & Firth, 2004). Since the two components of perceived control, personal mastery and perceived constraints, demonstrate distinct patterns of change in adulthood, the proposed study will examine perceived control in

the overall sense, in addition to examining each of the components individually. This approach facilitates a more thorough investigation of the influence of control on well-being by potentially parsing the differential impact of differing levels of mastery and constraints.

Perceived control has been linked to both physical (e.g., cortisol responses; Bollini, Walker, Hamann, & Kestler, 2004) and mental health (e.g., anxiety; Lachman et al., 2011) outcomes and, therefore, is an important factor to examine. In the present study, perceived control is considered in relation to a specific mental health outcome: affect. Affect denotes mental states which involve evaluative feelings (Parkinson, Totterdell, Bryner, & Reynolds, 1996). Several circumplex models of affective structure have been proposed, but one of the more predominant models suggests that affect is comprised of two distinct dimensions, positive and negative. Positive affect is indicative of feelings of pleasantness and negative affect is indicative of feeling of unpleasantness (Watson & Tellegen, 1985).

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 (Deci & Ryan, 2000). When achieved, this experience is associated with a sense of well-being (Deci & Ryan, 2000; Sheldon, Elliot, Kim, & Kasser, 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 incompetence (Skinner, 1996). There has been greater attention focused on the direct relationship between perceived control and affect (e.g., Bookwala & Fekete, 2009; Bye & Pushkar, 2009; DeNeve &

Cooper, 1998; Windsor & Anstey, 2010). However, since it is likely that there are additional variables that may be playing some role in the relationship between control and the experience of affect, there is a need for further study of the relationship between these constructs, as well as those other variables that may potentially influence the relationship.

Beyond the theoretical rationale for the existence of a relationship between perceived control and affect, more broadly, there is also empirical and theoretical evidence suggesting that this relationship may vary with age. Empirically, longitudinal and cross-sectional studies provide equivocal results regarding the age-related trajectory of positive affect. Using experience sampling to measure experiences of positive affect, Carstensen, Pasupathi, Mayr, and Nesselroade (2000) found no age-related differences in positive affect across individuals aged 18 to 94 years. Contrastingly, analyses of longitudinal affect data collected over 23 years from 2,804 participants indicated that the frequency of positive emotional experiences may decrease slightly within older adulthood, but overall is similar across middle and older adulthood (Charles, Reynolds, & Gatz, 2001). Finally, a more recent large-scale cross-sectional analysis suggests higher levels of low-arousal, positive affect in older, relative to middle adulthood (Windsor, Burns, & Byles, 2013). Research on the frequency of negative emotional experiences indicates declines from age 18 to 60, after which findings are more discrepant, but overall suggest little change in either direction (Carstensen et al., 2000; Charles et al., 2001; Cheng, 2004). These differences in affect across adulthood serve as one marker of age differences in the broader affective experience.

From a theoretical perspective, socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999) addresses age differences in affective outcomes, suggesting that future-time perspectives influence human goal selection. Specifically, as we age, there is a tendency to desire

engagement in more emotionally meaningful activities, as opposed to those that are more related to knowledge acquisition. The strength and vulnerability integration model (SAVI; Charles, 2010) complements this notion, proposing that aging is associated with a strengthening of the successful application of attentional strategies, appraisals, and behaviors to modulate daily emotional experiences. With the use of these strengths, older adults may be better able to attenuate negative affective experiences that have typically been associated with low levels of control. Since age-related differences in emotional experiences and emotion-regulation may differentially influence the relationship between measures of control and affect, the control-affect relationship will also be examined with age as a moderator variable.

As previously alluded to, affect is a dynamic construct, which may be influenced by many variables. Having been implicated in numerous health outcomes, including the experience of affective episodes, dysregulation of daily activities is one additional variable that may influence the association of perceived control and affect (Ehlers, Frank, and Kupfer, 1988; Grandin, Alloy, & Abramson, 2006). Throughout each day, the daily activities that individuals engage in (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, Bromundt, & Cajochen, 2009).

Empirically, much of the current literature on social rhythmicity has focused on the detrimental impact of rhythm disruption, where decreased social rhythmicity 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). Fewer 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. Nevertheless, the consistent allocation of time spent on daily activities may promote a sense of predictability, at the psychological level, and regularity, at the level of circadian entrainment, which may facilitate the experience of increased affective well-being in those individuals with lower perceived control. Ivanova and Israel (2005) demonstrated the moderating role of regularity in daily activities and events in the relationship between pessimistic attributional style and depressive symptoms (as measured by the Beck Depression Inventory; BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) in a sample of college students. Specifically, for individuals who were more regular, 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 by Ivanova and Israel (2005) are not identical to those in the proposed study, the findings from their study lend theoretical and empirical support for a conceptual model where regularity of daily activities moderates the relationship between views of the self and affective outcomes. However, since the sample examined younger adults ranging in age from 17-23 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 an increasingly 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.

The current study utilizes data from two of the MIDUS-II research projects: Project 1 (follow-up of MIDUS-I demographic information and psychological constructs) and Project 2 (National Study of Daily Experiences II; NSDE-II). 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 has the following aims:

Aim 1: To examine if the constructs of overall perceived control, personal mastery, and perceived constraints independently predict positive affect and negative affect.

Aim 2: To examine if the relationship between overall perceived control and positive affect and negative affect differs by age.

Aim 3: To examine if regularity predicts positive and negative affect.

Aim 4: To examine if the relationship between overall perceived control and positive and negative affect varies by regularity in duration of daily activities.

Aim 5: To examine if the relationship between two aspects of perceived control, personal mastery and perceived constraints, and affect (positive/negative) varies by regularity in duration of daily activities.

Based on the above-mentioned research, it was hypothesized that perceived control, personal mastery, and perceived constraints would each uniquely positively predict positive affect and negatively predict negative affect (Aim 1). Further, it was anticipated that the overall measure of control would be less strongly associated with affective outcomes as age increases (Aim 2). Regularity was hypothesized to predict positive and negative affect (Aim 3) with higher levels of regularity predicting greater positive affect and lower levels predicting greater negative

affect. Finally, it was hypothesized that increased regularity will buffer the effects of low perceived control (Aim 4), low personal mastery (Aim 5), and high perceived constraints (Aim 5) on positive/negative affect.

2. METHODOLOGY

Participants

The sample of interest for the current study was derived from those individuals who completed both Project 1 and Project 2 (NSDE-II) of MIDUS-II, the second-wave of a nationally representative study of community-dwelling adults who were selected utilizing random digit dialing from working telephone banks in the United States. To maintain longitudinal response and retention rates, NSDE-II respondents were sent a check for $25. 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 to 2 years of college (70.7%). On average, participants self-rated themselves as being in good health (M = 2.35, SD = .99, on a Likert-type scale where 1 = *excellent* and 5 = *poor*). Complete descriptive statistics are listed in Table 1.

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	2.8
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)

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

Procedure

Individuals were initially contacted by phone and informed that they would be participating in a study conducted through the Harvard Medical School that examines health and well-being during the middle years of life. Respondents were asked to report a list of individuals older than age 25 and currently residing in the household, from which a random individual was selected for MIDUS participation.

Data collection for MIDUS-II, Project 1 occurred through structured telephone interviews and mail surveys. Measures of demographics, personal mastery, perceived constraints, and positive and negative affect were embedded within the Project 1 self-administered questionnaires (SAQs), 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.

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 high interest for the current study, both marital status and racial origins were dichotomized (i.e., married/non-married, White/Other), in order to promote a more parsimonious model. Overall, variables that served as covariates in the model based on their differential associations with affect included: age, sex, race, marital status, self-rated health, and years of education (Steptoe, Leigh, & Kumari, 2011).

Perceived control. Overall perceived control was measured by combining items from personal mastery and perceived constraints scales, for a total of 12 items (see Appendix). The mastery scale is comprised of four questions that measure an individual’s beliefs about his or her

ability to carry out goals. Two items were created by Lachman and Weaver (1998) and two items were drawn from Pearlin and Schooler's Mastery Scale (1978). Personal mastery items were reverse coded, so that higher scores would indicate higher levels of overall perceived control. 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 & Weaver, 1998). Five items were drawn from Pearlin and Schooler's mastery scale (1978) and three items were created by Lachman and Weaver (1998). Higher scores indicated higher levels of perceived constraints.

All responses were rated on a 7-point Likert scale (1 = *strongly agree* and 7 = *strongly disagree*). An overall score of perceived control was constructed by calculating the mean of the 12 total items, with higher scores representing higher levels of perceived control. Cases were excluded if responses were missing from at least half of each scale. Both the individual subscales (Cronbach's α personal mastery = .78, Cronbach's α perceived constraints = .86) and the overall measure of perceived control (Cronbach's α = .68) demonstrated good to adequate internal reliability in NSDE-II sample. Additionally, the convergent validity of the measure items was 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 & 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 & 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 probe questions to

collect information on daily physical and psychological health, as well as daily experiences. The items of interest were those that asked participants how much time was spent on various activities in the preceding 24 hours. Based on their similarity to social rhythm activities that have previously been associated with mood outcomes (Ashman et al., 1999; Monk, Kupfer, Frank, & Ritenour, 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 one 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 seven 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 adapted for MIDUS-II from pre-established and validated scales including the Positive and Negative Affect Scales (Watson, Clark, & Tellegen, 1988) 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*). A positive affect score was then calculated by summing scores on each of the items. Items were recoded so that higher average scores indicated greater positive affect. This measure demonstrates high internal reliability based on the NSDE-II sample (Cronbach's $\alpha = .94$).

Daily 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. A negative affect score was calculated by summing scores on each of the 14 items. Items were recoded so that higher scores reflected greater negative affect. This measure of negative affect demonstrates good internal reliability in the NSDE-II sample (Cronbach's $\alpha = .95$).

3. RESULTS

Statistical significance was set at the 0.05 probability level with results reported from SPSS version 20. In the present analyses, the largest number of predictors in any one regression model was eleven. For a multiple regression analysis with eleven predictors, predicting an effect size of at least 0.02, at an alpha level of .05, a sample size of 1,548 participants yields a power of approximately .98 (Faul, Erdfelder, Lang & Buchner, 2007).Thus, there is 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.

Perceived Control and Regularity Predicting Affect

Summary of analyses. Two separate, multi-tiered regression analyses using the product term analysis method were used test the hypotheses that variability in the duration of daily activities moderates the relationship between overall perceived control and positive and negative affect, respectively (Aim 4; Frazier, Tix, & Barron, 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 (Aim 1). In the third step, the standardized moderator variable, composite regularity (Aim 3), was added. In the final step, the product term reflecting the interaction of perceived control and regularity was added to the model (Aim 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, 1538) = 49.24, $p < .001$. The entry of overall perceived control in step 2 explained an

additional 17.5% of variance, $R^2 = .34$, F_{inc} (1, 1537) = 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 variance, $R^2 = .34$, F_{inc} (1, 1535) = 6.50, $p = .01$. The regularity by sense of control interaction term significantly predicted positive affect. In summary, older age, better self-rated health, being married, identifying as White, and having an increased sense of control were associated with greater 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 figures in the document utilize the same method of depiction with the moderator variable changed, accordingly. As depicted in Figure 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 are reporting greater positive affect than those who are less regular. At high levels of perceived control, greater regularity was associated with slightly less positive affect.

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*

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

Note. 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.

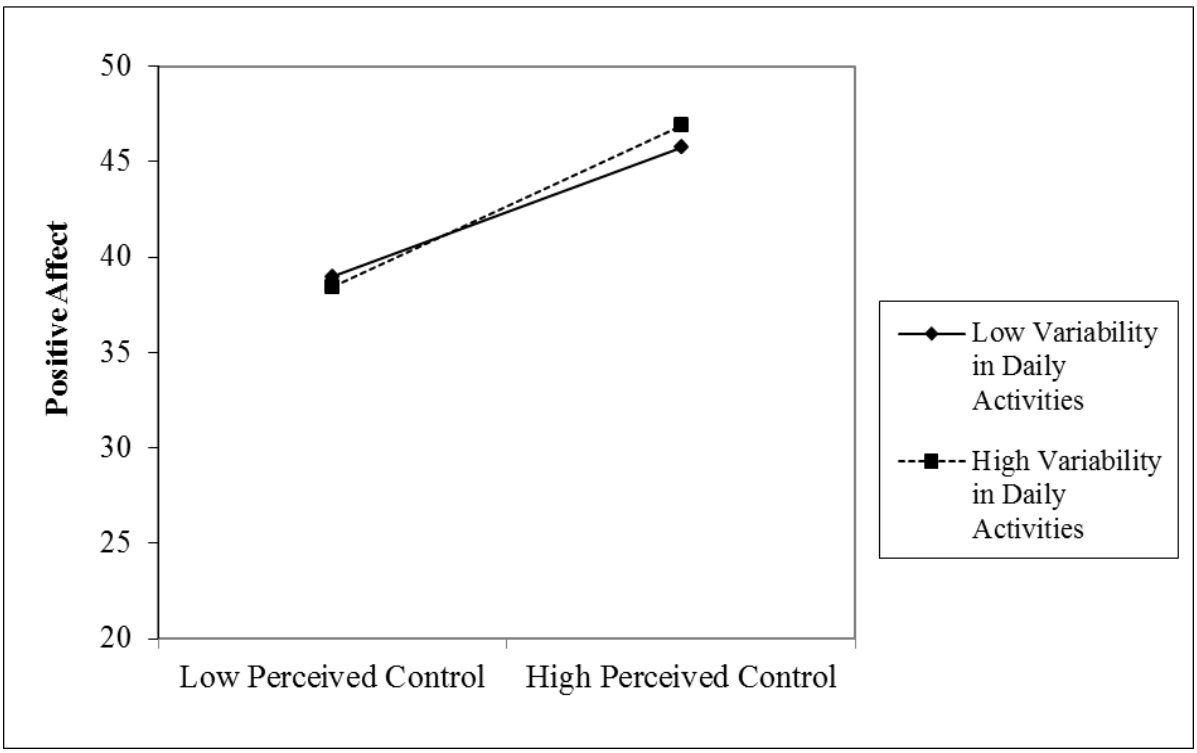

Figure 1. Significant regularity interaction term in the relationship between perceived control and positive affect.

Perceived control and regularity predicting negative affect. *R* was significantly different from zero at the end of all four steps (see Table 3). After step 1, with the covariates included in the equation, $R^2 = .16$, 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, F_{inc} (1, 1535) = 5.88, $p = .02$. 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 low in regularity, relative to those who demonstrate greater regularity (see Figure 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.

Table 3

Regression Analyses Predicting Negative Affect by Covariates, Perceived Control, Regularity, and a Perceived Control by Regularity Interaction Term

Step 1	Δ R^2 = .16**			Step 2	Δ R^2 = .15**			Step 3	Δ R^2 = .001			Step 4	Δ 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*

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

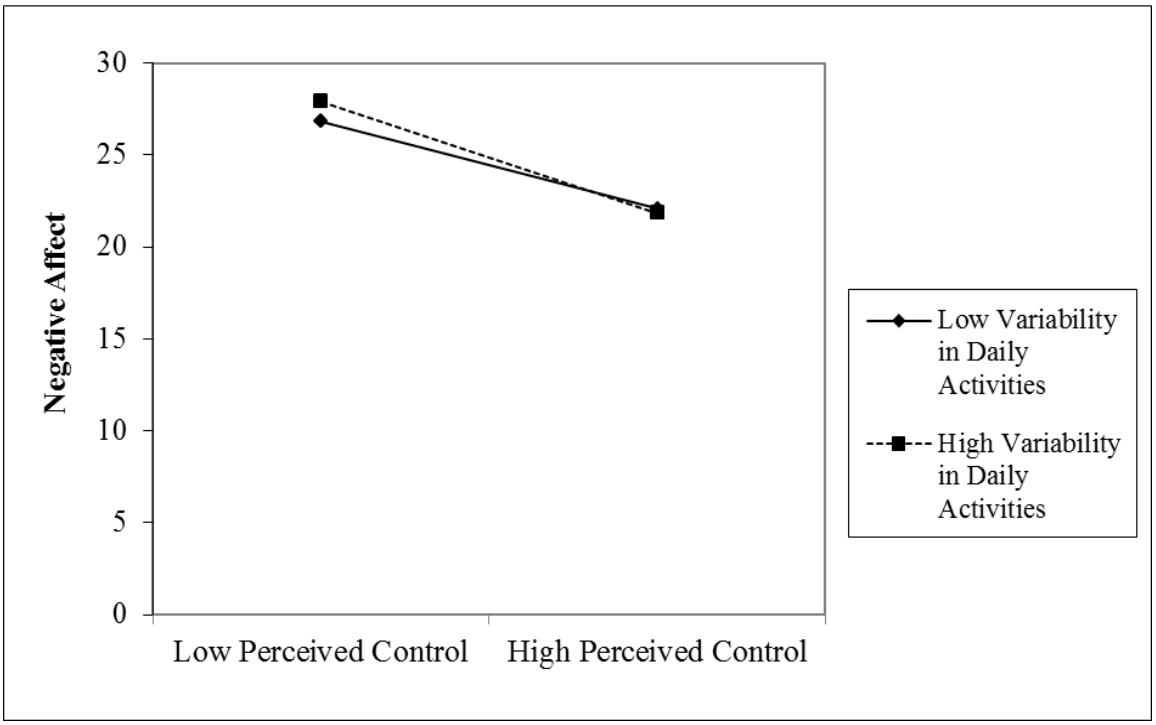

Figure 2. Significant regularity interaction term the relationship between perceived control and negative affect.

Perceived Control, Age, and Affect

Multi-tiered regression analyses were also used to examine whether the relationship between the measure of overall perceived control and positive and negative affect varied by age. We were specifically interested in knowing if, beyond the main effects, the interaction of age and control accounted for a significant amount of additional variance, when controlling for the previously identified sociodemographic variables. For respective models predicting positive and negative affect, variables were entered in the following order: sex, self-rated physical health, education, marital status, and race in step 1, age in step 2, perceived control in step 3, and, in step 4, the age by perceived control term was entered.

R was significantly different from zero at the end of all four steps. Results from the regression analyses examining positive affect as the dependent variable are presented in Table 4. In step 1, better physical health, being married, and identifying with a non-White race, were each associated with greater positive affect. In step 2, age was positively associated with positive affect, indicating that greater age is associated with greater positive affect. At step 3, overall perceived control was significantly positively associated with positive affect. In step 4, the age by control interaction term was significant. These results signified that higher levels of perceived control were associated with greater positive affect, but that this relationship varies by age. The accompanying figure portrays how positive affect changes at differing ages, as perceived control increases (see Figure 3).

Table 4

Regression Analyses Predicting Positive Affect by Covariates, Age, Perceived Control, and a Perceived Control by Age Interaction Terms

Step 1	Δ R^2 = .12**			Step 2	Δ R^2 = .05**			Step 3	Δ R^2 = .18**			Step 4	Δ R^2 = .004*		
	B	SE *B*	B		*B*	SE *B*	β		*B*	SE *B*	β		*B*	SE *B*	β
Sex	.03	.42	.00	Sex	.22	.41	.01	Sex	.70	.37	.04	Sex	.67	.37	.04
Health	-2.97	.22	-.34**	Health	-3.15	.21	-.36**	Health	-1.99	.20	-.23**	Health	-2.00	.20	-.23**
Education	-.12	.09	-.03	Education	-.03	.08	-.01	Education	-.14	.08	-.04	Education	-.13	.08	-.04
Marital Status	1.12	.47	.06*	Marital Status	1.37	.46	.07*	Marital Status	1.02	.41	.05*	Marital Status	.98	.41	.05*
Race	-2.22	.81	-.07*	Race	-2.54	.79	-.08*	Race	-2.42	.71	-.07*	Race	-2.32	.71	-.07*
				Age	1.88	.20	.22**	Age	1.82	.18	.21**	Age	1.78	.18	.21**
								Perceived Control	3.83	.19	.44**	Perceived Control	3.81	.19	.44**
												Control by Age	-.51	.18	-.06*

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

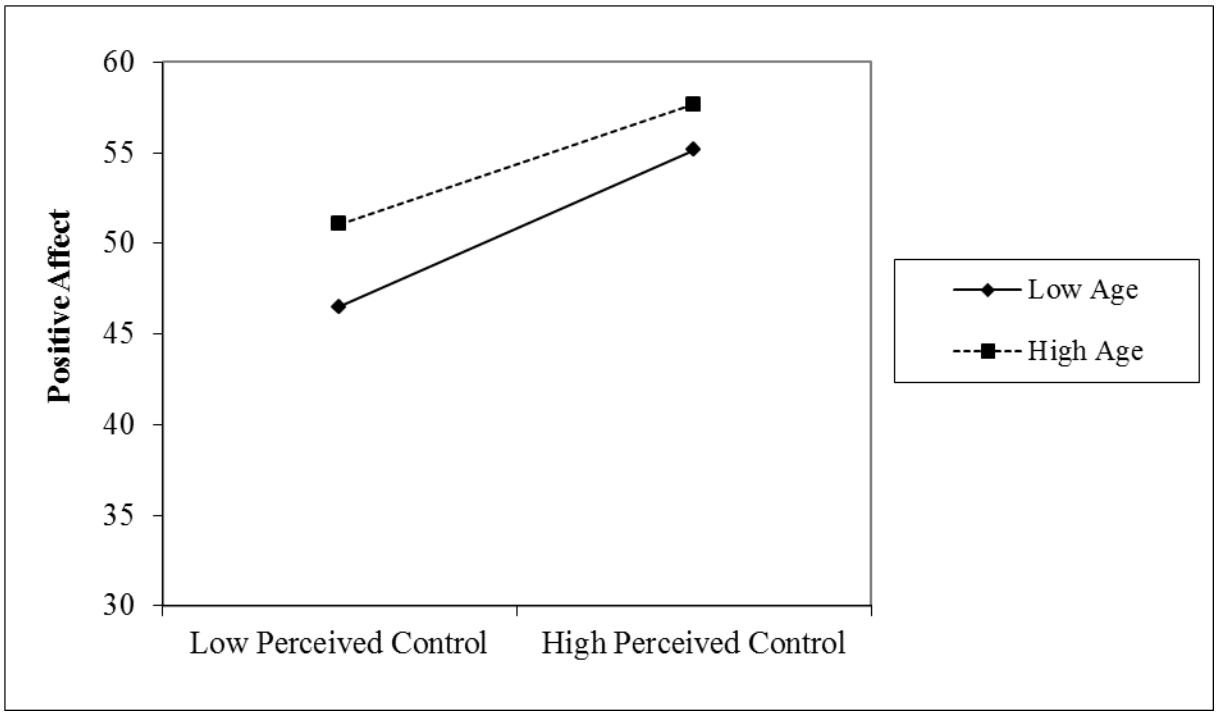

Figure 3. Significant age interaction in the relationship between perceived control and positive affect.

Results from the negative affect regression analyses are presented in Table 5. In step 1, being a female, having worse self-rated physical health, and not being married were associated with greater negative affect. In step 2, age was negatively associated with negative affect, implying that greater age is associated with less negative affect. At step 3, perceived control was significantly negatively associated with negative affect. Finally, in step 4, the age by perceived control interaction term was significant, where less perceived control was associated with more negative affect, but that relationship varies across ages. The accompanying figure portrays how negative affect changes at given levels of perceived control as age increases (see Figure 4).

Table 5

Regression Analyses Predicting Negative Affect by Covariates, Age, Perceived Control, and a Perceived Control by Age Interaction Term

Step 1			Δ R^2 = .09**	Step 2			Δ R^2 = .07**	Step 3			Δ R^2 = .15**	Step 4			Δ R^2 = .007**
	B	SE *B*	β		*B*	SE *B*	β		*B*	SE *B*	β		*B*	SE *B*	β
Sex	.90	.34	.07*	Sex	.72	.32	.05*	Sex	.38	.30	.03	Sex	.41	.29	.03
Health	1.99	.17	.29**	Health	2.16	.17	.32**	Health	1.34	.16	.20**	Health	1.34	.16	.20**
Education	.08	.07	.03	Education	.00	.07	.00	Education	.08	.06	.03	Education	.07	.06	.03
Marital Status	-.78	.37	-.05*	Marital Status	-1.01	.36	-.07*	Marital Status	-.76	.33	-.05*	Marital Status	-.73	.33	-.05*
Race	.44	.65	.02	Race	.74	.62	.03	Race	.65	.57	.03	Race	.54	.57	.02
				Age	-1.77	.16	-.26**	Age	-1.72	.15	-.26**	Age	-1.67	.15	-.25**
								Perceived Control	-2.72	.15	-.40**	Perceived Control	-2.71	.15	-.40**
												Control by Age	.56	.14	.09**

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

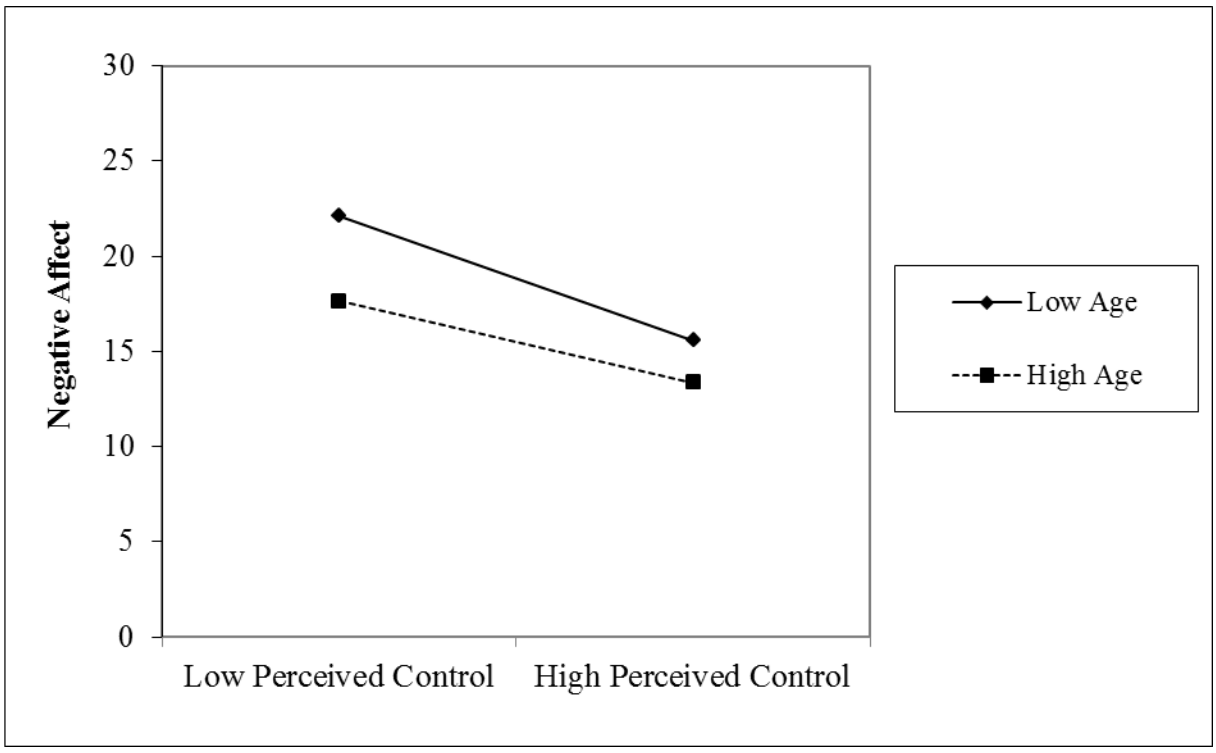

Figure 4. Significant age interaction in the relationship between perceived control and negative affect.

Personal Mastery, Perceived Constraints, and Regularity Predicting Affect

Summary of analyses. Two additional, multi-tiered regression analyses were conducted to test the hypotheses that variability in the duration of daily activities moderates the relationship between personal mastery, perceived constraints, and positive and negative affect (Aim 5; Frazier, Tix, & Barron, 2004). In the first step, the aforementioned six covariate variables were entered. For the second step, the standardized predictor variables, personal mastery and perceived constraints, were added to the model (Aim 1). In the third step, the standardized moderator variable, composite regularity, was added (Aim 3). In the final step, the product terms reflecting the interactions of personal mastery and regularity and perceived constraints and regularity were added to the model (Aim 5).

Personal mastery, perceived constraints, and regularity predicting positive affect. *R* was significantly different from zero at the end of each step (see Table 6). After step 1, with the covariates included in the equation, $R^2 = .16$, F_{inc} (6, 1538) = 49.24, $p < .001$. Age, physical health, marital status, and race were significant predictors. The entry of personal mastery and perceived constraints in step 2 explained an additional 17.5% of variance, $R^2 = .34$, F_{inc} (2, 1536) = 202.59, $p < .001$. Both personal mastery and perceived constraints emerged as significant predictors. The addition of the regularity variable to the equation in step 3 did not reliably improve R^2. In the final step, the addition of the regularity by personal mastery and regularity by perceived constraints interaction terms accounted for an additional .3% of variance, $R^2 = .34$, F_{inc} (2, 1533) = 3.79, $p = .02$. Therefore, in this model, older age, better health, associating with a race other than White, and being married were each associated with more positive affect. Additionally, greater personal mastery and lower perceived constraints were also associated with more positive affect. Finally, the significant interaction term suggests that at high levels of perceived constraints, positive affect is reported to be higher by those who are more regular as opposed those who are less regular (see Figure 5).

Table 6

Regression Analyses Predicting Positive Affect by Covariates, Personal Mastery, Perceived Constraints, Regularity, and Personal Mastery and Perceived Constraints by Regularity Interaction Terms

Step 1			Δ R^2 = .16**	Step 2			Δ R^2 = .18**	Step 3			Δ R^2 = .00	Step 4			Δ 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	.22**	Age	.15	.02	.21**
Sex	.22	.41	.01	Sex	.71	.37	.04	Sex	.71	.37	.04	Sex	.73	.37	.04
Health	-3.15	.21	-.36**	Health	-1.99	.20	-.23**	Health	-1.99	.20	-.23**	Health	-2.01	.20	-.23**
Education	-.03	.08	-.01	Education	-.13	.08	-.04	Education	-.13	.08	-.04	Education	-.13	.08	-.04
Marital Status	1.37	.46	.07*	Marital Status	1.04	.41	.05*	Marital Status	1.04	.41	.05*	Marital Status	.98	.41	.05*
Race	-2.54	.79	-.08*	Race	-2.42	.71	-.07*	Race	-2.43	.71	-.07*	Race	-2.51	.71	-.08**
				Personal Mastery	1.53	.21	.18**	Personal Mastery	1.53	.21	.18**	Personal Mastery	1.50	.21	.17**
				Perceived Constraints	-2.80	.22	-.33**	Perceived Constraints	-2.81	.22	-.33**	Perceived Constraints	-2.80	.22	-.32**
								Regularity	.12	.18	.01	Regularity	.16	.18	.02
												PM by Regularity	-.06	.20	-.01
												PC by Regularity	-.48	.19	-.06*

Note: PM = Personal Mastery; PC = Perceived Constraints

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

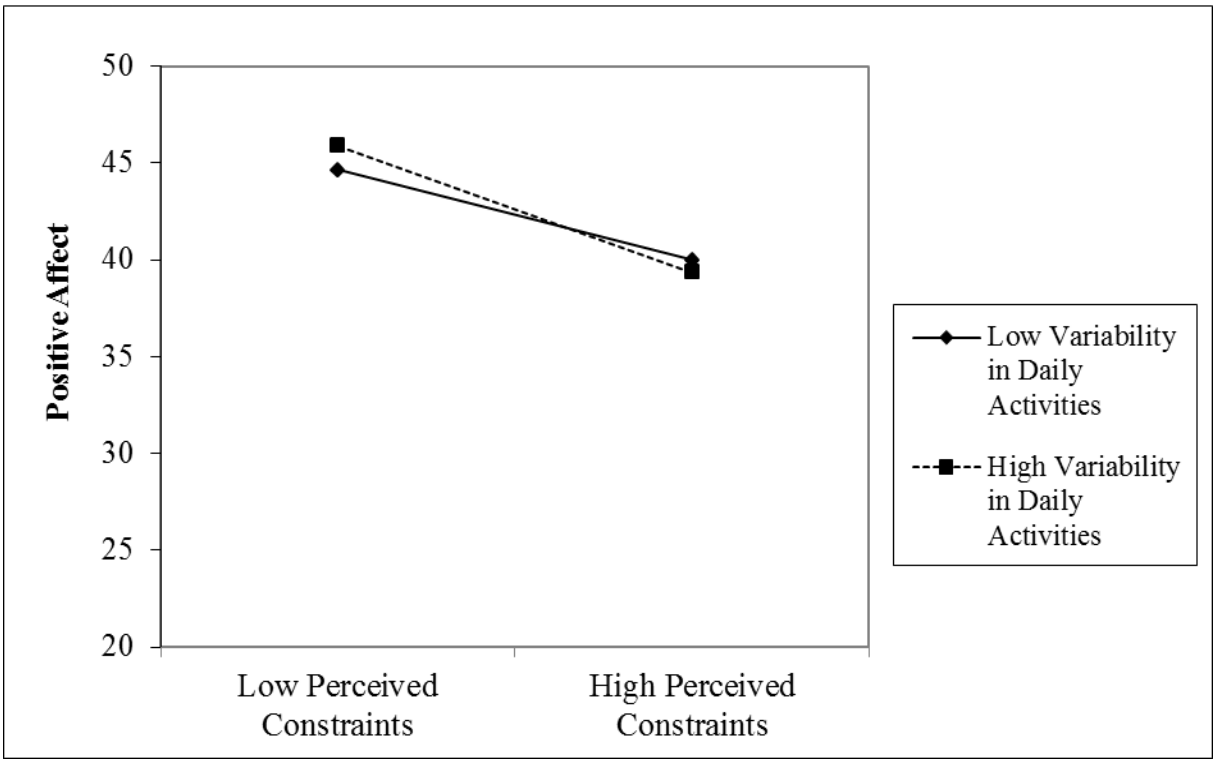

Figure 5. Significant regularity interaction term in the relationship between perceived constraints and positive affect.

Personal mastery, perceived constraints, and regularity predicting negative affect. *R* was significantly different from zero at the end of all four steps (see Table 7). After step 1, with the covariates included in the equation, $R^2 = .16$, F_{inc} (6, 1538) = 47.03, $p < .001$. Age, sex, education, and health were significant predictors. The entry of personal mastery and perceived constraints in step 2 resulted in a 15.2% increment in R^2, $R^2 = .31$, F_{inc} (2, 1536) = 168.78, $p < .001$. In this step, perceived constraints emerged as a significant predictor. The addition of the regularity variable in step 3 did not account for any reliable improvements in R^2. In step 4, the addition of the regularity by perceived constraints and regularity by personal mastery interaction terms explained an additional .3% of variance in negative affect, $R^2 = .31$, F_{inc} (2, 1533) = 3.5, *p*

= .03. The regularity by perceived constraints interaction term was a significant predictor. In the final model, older age, better health, and lower perceived constraints were predictive of lower negative affect. Additionally, the significant interaction term suggests that in individuals who perceive greater constraints, there was a unique tendency for greater regularity to mitigate the negative relationship between greater perceived constraints and greater negative affect (see Figure 6).

Table 7

Regression Analyses Predicting Negative Affect by Covariates, Personal Mastery, Perceived Constraints, Regularity, and Personal Mastery and Perceived Constraints by Regularity Interaction Terms

Step 1			Δ R^2 = .16**	Step 2			Δ R^2 = .15**	Step 3			Δ R^2 = .001	Step 4			Δ 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	.39	.29	.03	Sex	.39	.29	.03	Sex	.37	.29	.03
Health	2.16	.17	.32**	Health	1.33	.16	.19**	Health	1.32	.16	.19**	Health	1.34	.16	.20**
Education	.00	.07	.00	Education	.11	.06	.04	Education	.11	.06	.04	Education	.11	.06	.04
Marital Status	-1.01	.36	-.07*	Marital Status	-.68	.33	-.05*	Marital Status	-.68	.33	-.05*	Marital Status	-.63	.33	-.04
Race	.74	.62	.03	Race	.74	.56	.03	Race	.73	.56	.03	Race	.78	.56	.03
				Personal Mastery	-.32	.17	-.05	Personal Mastery	-.33	.17	-.05*	Personal Mastery	-.31	.17	-.05
				Perceived Constraints	2.62	.17	.39**	Perceived Constraints	2.61	.17	.39**	Perceived Constraints	2.60	.17	.39**
								Regularity	.20	.15	.03	Regularity	.17	.15	.03
												PM by Regularity	.03	.16	.00
												PC by Regularity	.36	.15	.06*

Note: PM = Personal Mastery; PC = Perceived Constraints

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

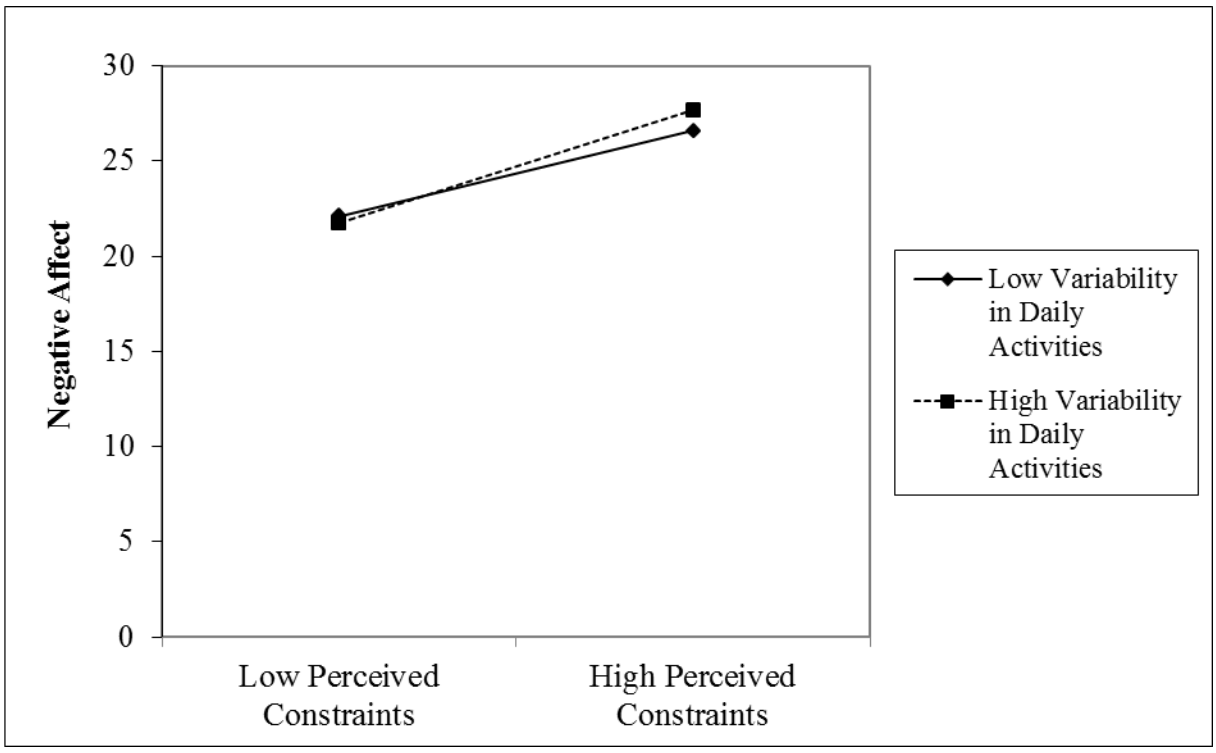

Figure 6. Significant regularity interaction term in the relationship between perceived constraints and negative affect.

Follow-up Analyses

Additional, regression analyses were run to further explore the non-significant relationship between personal mastery and negative affect. Specifically, we examined how the personal mastery and perceived constraints constructs interact in relation to negative affect. The regression model was comprised of the aforementioned sociodemographic variables entered in step 1, the perceived constraints term entered in step 2, the personal mastery term entered in step 3, and the mastery by constraints interaction term was entered in step 4. Findings from these analyses indicated that in step 4, the addition of the mastery by perceived constraints interaction terms explained an additional .8% of variance in negative affect, $R^2 = .31$, F_{inc} (1, 1535) = 18.6, $p < .001$. The mastery by constraints interaction term, $\beta = -.95$, $p < .001$, was a significant

predictor. The relationship suggests that, in the present sample, individuals who scored at least 2 standard deviations above the overall sample on the perceived constraints measure reported less negative affect as personal mastery increased. However, for those who scored below the 2 standard deviations on measures of perceived constraints, there was little change in negative affect, regardless of level of personal mastery.

4. DISCUSSION

Findings from the present study corroborate the relationship between a general sense of perceived control and positive and negative affect, where decreased control is predictive of lower positive and greater negative affect (Aim 1). This relationship was present even when accounting for other influential demographic variables such as age, race, marital status, and health. On further examination, the relationship between control and affect also varies by age such that low levels of perceived control appear to be related to more negative affective outcomes at younger, relative to older, ages (Aim 2). When personal mastery and perceived constraints, the proposed component parts of perceived control, were examined in relation to affect, somewhat unexpected results emerged. Specifically, perceived constraints predicted both positive and negative affect whereas personal mastery significantly predicted positive, but not negative, affect (Aim 1). The present analyses also extended current research by offering insight into the influence of regularity in daily activities on the control-affect relationship. Of note, daily regularity was found to moderate the relationships of perceived control and both positive and negative affect (Aim 4), as well as perceived constraints and positive and negative affect (Aim 5). In each case, individuals who scored lower on perceived control or higher on perceived constraints measures were more likely to have positive affective outcomes when they demonstrated greater regularity in daily activities. The specific findings are discussed first in terms of the perceived control and affect relationship with the discussion then focusing on how regularity functions in the relationship between control and affect and, finally, how the relationship of perceived control and affect varies by age is discussed.

The Control-Affect Relationships

Consistent with existing empirical research, as well as the self-determination theory, the well-established relationship between positive and negative affect and an individual's sense of overall perceived control was reaffirmed (Bye & Pushkar, 2009; Deci & Ryan, 2000). In the context of the present study this means that those individuals who believe that they are in control of what happens in their lives, or that their actions have served some beneficial purpose, were more likely to endorse feelings such as 'active' or 'proud', and less likely to endorse feelings such as 'worthless' or 'hopeless'. Further decomposition of the perceived control construct into its component parts, personal mastery and perceived constraints, resulted in several novel patterns of findings. The relationship between perceived constraints and affect corroborates prior research that has associated increased perceived constraints with less life satisfaction (a positively- valenced construct) and greater depressive symptoms (a negatively-valenced construct; Lachman & Weaver, 1998). However, the finding that personal mastery predicted positive but not negative affect was unanticipated and differs from Lachman and Weaver's (1998) identification of personal mastery as being significantly negatively associated with depressive symptoms, as well as other findings (e.g., Bookwala & Fekete, 2009) that have specifically related personal mastery with negative affect. On further examination, however, a moderating relationship was identified among perceived constraints, personal mastery, and negative affect, where personal mastery is associated with reduced negative affect most strongly at high levels of perceived constraints. The reciprocal relationship is also true, where increased perceived constraints predict more negative affect, particularly when personal mastery is low. Consequently, high levels of personal mastery seem to be most beneficial for a specific group of individuals, those who are high in perceived constraints, and less beneficial for others who are

experiencing less perceived constraints. As such, the non-significant relationship between personal mastery and negative affect may be partially explained by the fact that the relationship of personal mastery with negative affect differs at varying levels of perceived constraints.

Nonetheless, the non-significant mastery and negative affect finding is interesting on multiple levels. First, this finding reinforces the notion that positive and negative affect are, to some extent, independent constructs. Second, this finding inspired additional analyses which point to a moderating relationship between personal mastery, perceived constraints, and negative affect. This suggests that unique information may be gleaned from examining perceived control in terms of its component parts.

Overall, the control-affect findings suggest that a greater sense of control is conducive to more positive affective outcomes across ages. However, age emerged as a moderator variable in the relationship between perceived control and both positive and negative affect, suggesting that for some age groups, a greater sense of perceived control may be more beneficial than for others. Of note, at low levels of perceived control, the oldest respondents in the sample reported the best affective outcomes. However, relative to the oldest respondents, for respondents 69 years and younger, affective outcomes increased at a higher rate with increases in perceived control, such that for those younger respondents who were high in control, affective outcomes were better than for older respondents with the same levels of control. These results are consistent with the SAVI model of emotion regulation in adulthood (Charles, 2010), as it appears that as age increases, the affective experience is influenced to a lesser extent by perceptions of control, particularly when perceived control is low. In other words, older adults' emotion regulation strategies may be buffering the negative influence of variables that are detrimental in earlier stages of adulthood.

The Role of Regularity in the Control-Affect Relationships

In the present study, regularity in the duration of time spent on daily activities did not uniquely predict positive or negative affect (Aim 3). Further, just as personal mastery did not significantly predict negative affect, inclusion of the regularity variable in the model did not influence the relationship between personal mastery and positive/negative affect. Although a direct relationship between regularity and affect was anticipated, 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 one week. Whereas circadian rhythms follow a 24-hour 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 additional insight into the relationship between regularity and affect. Specific questions might have asked participants to indicate if the time-span reported on was typical and if the respondent has a preference for routine or regularity, in order to ascertain if the typicality of the daily activities or aversion to regularity may confound the relation of regularity to affect. Lastly, 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.

Nonetheless, the present analyses suggest that regularity in daily activities moderates the relationship of overall perceived control and perceived constraints 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. As hypothesized, regularity during daily activities may provide some 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 may be 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 provide some sort of relief, thus buffering the relationship with the 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. 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. It is possible, then, that perceived regularity is equally, or more, important to consider relative to the association between perceived control and affect.

Sociodemographic Variables and Affect

Finally, this study also contributes information to the existing literature examining how demographic characteristics relate to positive and negative affect. Age, sex, race, education level, marital status, and self-rated health were all included in the present analyses due to previously identified relationships between each of these variables and affect. Consistent with empirical and theoretical research (Carstensen et al., 1999; Steptoe et al., 2011), greater age and better self-rated health were associated with more positive and less negative affect. Further, marital status emerged as a significant predictor of both positive and negative affect, while race predicted only positive affect. Education did not predict positive or negative affect. In this study, as in others, education was used as a proxy for socioeconomic status. Since these findings differ from other accounts of a significant relationship between socioeconomic status and affect, additional studies should be conducted to ascertain the true relationship between socioeconomic status and affect, as well as to determine if education is suitable for use as a proxy variable.

Limitations

One limitation of the present study lies in the measure of perceived control. Although the measure of perceived control used in the present study has demonstrated reliability and validity across various studies, it is a domain-general, rather than domain-specific measure of perceived control. Whereas domain-specific measures of perceived control examine the extent to which

individuals feel in control of specific capacities or experiences (e.g., memory), the domain-general measure examines the extent to which one feels control over broader aspects of life. As such, domain-general measures of perceived 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. 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, Nesselroade, Featherman, & Rowe, 1997) or day-to-day (Ong, Bergeman, & Bisconti, 2005). Future studies would benefit from measuring control at a more specific level, as well as on a more frequent time scale, to promote acquisition of the most precise self-reports of perceived control.

An additional limitation was the use of self-report affect measures. However, this limitation is not unique to this study, but is characteristic of all self-report measures of affect, since self-report measures assume some degree of affect awareness. Put differently, individuals with higher affect awareness are more likely to accurately report their affect experiences relative to those with lower affect awareness. Nevertheless, it is simply important to be aware that there may be some distortion in the measurement of affect, but also understanding that there is no alternative method of measuring affect. Additionally, 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, Almeida, Smyth, & Stawski, 2009). Future studies examining these constructs would benefit from utilizing measures on smaller and more congruent time scales. For example, measuring control, regularity, and affect at the daily level. Finally, despite being a national, randomly

selected sample, variability in demographic characteristics was relatively small, indicating a need for a more demographically diverse sample.

Implications and Future Study

In summary, the present study demonstrated the associations of perceived control, personal mastery, and perceived constraints with positive and negative affect. The findings regarding the role of regularity in this relationship were equivocal; the sample size of the present study was large and regularity moderated the effect of perceived control and constraints 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 modified. 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. Further, this may be a more plausible behavioral target for individuals who are not as psychologically-minded, or do not prefer cognitive treatment approaches.

In conclusion, the presented results are promising. Future researchers would benefit from expounding on the current analyses by taking into account the limitations of this study. Notably, by measuring control, regularity, and affect on the same time-scale, future analyses 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., & Leibenluft, E. (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

Beck, A.T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961) An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561-571.

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.

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.

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

Carstensen, L.L., Isaacowitz, D.M., & Charles, S.T. (1999). Taking time seriously. A theory of socioemotional selectivity theory. *American Psychologist, 54*(3), 165-181.

Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselroade, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of Personality and Social Psychology, 79,* 644–655.

Charles, S. T. (2010). Strength and vulnerability integration: a model of emotional well-being across adulthood. *Psychological Bulletin, 136*(6), 1068.

Charles, S. T., Reynolds, C. A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of Personality and Social Psychology, 80*(1), 136-151.

Cheng, S. T. (2004). Age and subjective wellbeing revisited: a discrepancy perspective. *Psychology and Aging, 19,* 409–415.

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.

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist, 55*(1), 34-43. doi: 10.1037//0003066X.55.1.34

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.

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.

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.

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.

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.

Lachman, M. E. (2006). Perceived control over aging-related declines adaptive beliefs and behaviors. *Current Directions in Psychological Science, 15*(6), 282-286. doi:10.1111/j.1467-8721.2006.00453.x

Lachman, M. E., & Firth, K. M. (2004). The adaptive value of feeling in control during midlife. In O. G. Brim, C. D. Ryff, & R. Kessler (Eds.), *How healthy are we? A national study of well-being at midlife* (pp. 320–349). Chicago: University of Chicago Press.

Lachman, M. E., Neupert, S., & Agrigoroaei, S. (2011). The relevance of control beliefs for health and aging. In K. W. Schaie & S. L. Willis (Eds.), *Handbook of the Psychology of Aging* (7th ed., pp. 175-190). New York: Elsevier.

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.

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.

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.

Parkinson, B., Totterdell, P., Briner, R. B., & Reynolds, S. (1996). *Changing moods: The psychology of mood and mood regulation*. London: Addison Wesley Longman.

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

Prigerson, H. G., Reynolds III, C. F., 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.

Rowe, J. W., & Kahn, R. L. (1997). Successful Aging. *The Gerontologist,* 37 (4), 433-440. doi:10.1093/geront/37.4.433

Ryff, C.D., & Almeida, D.M. 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.

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.

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.

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.

U.S. Census Bureau. (2005). *Population reports: 65+ in the United States*. Washington, DC: U.S. Government Printing Office.

U.S. National Institute on Aging and U.K. Science and Innovation Network (2011). *Workshop on the role of well-being measures in public policy*. Washington, DC.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin, 98,* 219-235.

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

Windsor, T. D., Burns, R. A., & Byles, J. E. (2013). Age, Physical Functioning, and Affect in Midlife and Older Adulthood. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 68(3), 395- 309.

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

Appendix
Perceived Control Scale

Personal Mastery

1. I can do just about anything I really set my mind to.
2. When I really want to do something, I usually find a way to succeed at it.
3. Whether or not I am able to get what I want is in my own hands.*
4. What happens to me in the future mostly depends on me.*

Perceived Constraints

1. There is little I can do to change the important things in my life.*
2. I often feel helpless in dealing with the problems of life.*
3. Other people determine most of what I can and cannot do.
4. What happens in my life is often beyond my control.
5. There are many things that interfere with what I want to do.
6. I have little control over the things that happen to me.*
7. There is really no way I can solve the problems I have.*
8. I sometimes feel I am being pushed around in life.*

* indicates items from Pearlin and Schooler (1978)