**Understanding How Family Demands Impair Health Behaviors in Working Sole Mothers:
The Role of Perceived Control over Leisure Time**

Charles Calderwood
Virginia Tech
Department of Psychology
109 Williams Hall
890 Drillfield Drive
Blacksburg, VA, U.S.A. 24061
Phone: 540-231-6342
Email: ccharl2@vt.edu

Molly E. Minnen
Virginia Tech
Department of Psychology
109 Williams Hall
890 Drillfield Drive
Blacksburg, VA, U.S.A. 24061
Phone: 540-231-5870
Email: mminnen@vt.edu

Cassandra N. Phetmisy
Rice University
Department of Psychological Sciences
6100 Main Street
Houston, TX, U.S.A., 77005
Phone: 832-768-7745
Email: cphetmisy@rice.edu

Kate E. Kidwell
Georgia Institute of Technology
School of Psychology
654 Cherry St. NW
Atlanta, GA, USA, 30313
Phone: 443-876-3235
Email: kate.e.kidwell@gatech.edu

Kimberly A. French
Georgia Institute of Technology
School of Psychology
654 Cherry St. NW
Atlanta, GA, U.S.A., 30313
Phone: 404-894-6775
Email: kfrench9@gatech.edu

Danielle D. King
Rice University
Department of Psychological Sciences
6100 Main Street
Houston, TX, U.S.A., 77005
Phone: 713-348-4458
Email: Danielle.d.king@rice.edu

Correspondence should be directed to Charles Calderwood, Virginia Polytechnic Institute and State University, Department of Psychology, 109 Williams Hall, 890 Drillfield Drive, Blacksburg, VA, U.S.A. 24061; e-mail: ccharl2@vt.edu

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Abstract: Working sole mothers (i.e., non-partnered women who work) may experience elevated family demands that impose barriers to pursuing health behaviors during their daily leisure time. We aimed to map the process through which evening family demands influence leisure-time health behaviors in this priority population of employees, in an effort to identify targets for intervention development and health disparity reduction. Conducting a seven-day daily survey study in a sample of 102 working sole mothers, we supported perceptions of control over leisure time as a key mechanism linking evening family demands to leisure-time exercise. Furthermore, we identified the individual difference of present-focus (i.e., a tendency to focus on current experiences) as a key factor that alters how evening family demands affect control over leisure time, which ultimately mitigates the detrimental influence of these demands on evening exercise engagement. In contrast, we did not find evidence to support relationships of evening family demands with the health behaviors of leisure time consumption of alcohol or high sugar, high fat foods via control over leisure time. We discuss how our findings advance theory regarding how family demands influence health and inform practical efforts to reduce health disparities that working sole mothers face.

Keywords: *family demands; health behaviors; control; sole mothers; temporal focus*

There are 12 million single parent households in the United States, most of which are headed by working women (U.S. Census Bureau, 2017). Working sole mothers (i.e., non-partnered women who work) may face major challenges to maintaining their health (e.g., employment in lower quality jobs, greater financial insecurity; Bull & Mittelmark, 2009; Dziak et al., 2010). Because pursuing health behaviors (e.g., exercise, limiting alcohol use, consuming a nutritious diet) is critical to disease mitigation (Booth-Kewley & Vickers, 1994), understanding whether and how daily family demands influence health behaviors in working sole mothers may reduce health disparities these employees face. However, applied psychology research on health behaviors focuses predominately on how these behaviors support daily work recovery (e.g., Sonnentag, 2001), with little attention to antecedents of leisure-time health behavior engagement. Furthermore, mechanisms linking daily family demands to health behaviors have not been identified. These research gaps impede the theoretical development of the daily health behavior construct space and limit the potential for intervention development to support daily health behavior engagement.

We aim to map the process through which daily evening family demands influence leisure-time health behaviors in working sole mothers. Drawing on the Theory of Planned Behavior (TPB; Ajzen, 1991), we propose control over leisure-time (autonomy in deciding how time away from work is spent; Sonnentag & Fritz, 2007) as a key mechanism linking these demands to health behaviors, arguing that family demands undermine perceptions of control (Ozer, 1995; Rosenfield, 1989) that are critical to health behavior engagement (Ajzen, 1991; Mann & Ward, 2007). We also explore if daily family demand – health behavior linkages are shaped by one's subjective view of time (Shipp et al., 2009). We contend that individuals who have a strong present-focus (i.e., a tendency to devote attention to current experiences; Shipp et

al., 2009) feel greater control over their time that influences their daily perceived control over leisure, with downstream implications for leisure-time health behaviors. This possibility may have particular implications for efforts to reduce health disparities in working sole mothers, as temporal focus can change in response to intervention (Shipp & Aeon, 2019).

Our central intended contribution is to show that daily (i.e., family demands) and enduring (i.e., present-focus) factors relevant to control over leisure time shape daily health behaviors in working sole mothers. Although both family experiences (e.g., Ilies et al., 2017) and control over leisure time (e.g., Chawla et al., 2020) can vary from day to day[1], whether and how such variability relates to health behaviors has yet to be mapped. We thus build theory surrounding how perceptions of control link family demands to health behaviors. We suggest a novel individual difference (i.e., present-focus) that may inform when working sole mothers and other employees facing higher family demands see these demands influence their health behaviors. At the broadest level, we expand understanding of when, how, and why daily family demands influence daily health behaviors in the priority population of working sole mothers.

Theoretical Background

The TPB (Ajzen, 1991) explicates factors that influence volitional behaviors that people engage in, which includes health behaviors (e.g., Mazzaola et al., 2017). A central prediction of the TPB is that perceptions of control determine both the relevance of intentions to engage in behavior and behavior performance. Control perceptions are the only factor posited in TPB to bypass behavioral intentions and directly predict behavior. Furthermore, as Ajzen (1991) argues

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[1] Both theoretical and empirical evidence suggest that family demands and control over leisure time exhibit day-level variability, with researchers typically drawing on spillover – crossover models (Bakker et al., 2009) to understand predictors of day-to-day variability in family experiences and applications of the Effort – Recovery Model (Meijman & Mulder, 1998) to leisure experiences (Zijlstra & Sonnentag, 2006) and Conservation of Resources Theory (Hobfoll, 1989) to understand day-to-day variability in control over leisure time.

"intentions would be expected to influence performance to the extent that the person has behavioral control" (p. 183), bolstering the centrality of control to behavioral engagement. We thus focus on control perceptions rather than intentions because when control is limited by high demands, intentions may become theoretically less important.

Meta-analytic work has supported perceived behavioral control as a strong contributor to health behaviors, both absolutely (i.e., a large effect size linking control to these behaviors) and relatively (i.e., a larger effect size linking control to these behaviors than attitudes and subjective norms) (Hausenblas et al., 1997). Such control focuses on an individual's ability to choose their behavior (Ajzen, 1991), with control over leisure time further focusing on the ability to choose how to behave during time away from work (Sonnentag & Fritz, 2007). Thus, control over leisure time is a specific context for broader perceived behavioral control. We apply the TPB to explain how perceptions of control may link evening family demands to leisure-time health behaviors in the following section.

Hypothesis Justification

While the TPB focuses on implications (rather than antecedents) of perceptions of control (Ajzen, 1991), scholars have considered the potential for family demands to co-vary with lower control. For example, Ozer (1995) argued that family demands undermine self-efficacy to exercise control. Rosenfield (1989) similarly reasoned that family demands impair overall evaluations of control over life. Family demands may be particularly likely to impair perceptions of control over leisure time from day-to-day. Sonnentag and Fritz (2007) have argued that control over leisure time is beneficial because it boosts self-efficacy and increases feelings of competence, which aligns with Ajzen's (1991) explanation for why perceived behavioral control increases behavior in the TPB. Working sole mothers may be particularly likely to see reductions

in control over leisure time due to high family demands (Goldberg et al., 1992), as these mothers report feeling constricted in their leisure opportunities due to family factors (Condon, 2005). We thus predict that:

Hypothesis 1: Evening family demands negatively co-vary with control over leisure time.

Applying the TPB logic that perceived control is central to enacted behavior (Ajzen, 1991) to the current context, health behavior pursuit may be reduced when working sole mothers perceive lower control over leisure time. This is in line with arguments that control is harnessed to support health behavior engagement (Mann & Ward, 2007). When considering which health behaviors may be particularly sensitive to this reduction in control, engagement in exercise, limiting alcohol consumption, and limiting high sugar, high fat food consumption appear likely to be impacted. Perceived behavioral control is a salient contributor to exercise engagement (Hausenblas et al., 1997), which is thought to require control to initiate and maintain (Nagel et al., 2015). Researchers have also demonstrated that individuals drink less alcohol when they perceive greater control (Conner et al., 1999). Empirical evidence has been more mixed surrounding diet, but the TPB has been applied to suggest that perceived control supports healthy eating (Conner et al., 2002). Thus, we expect that working sole mothers will consume less high sugar, high fat food when they feel more control over their leisure time. To summarize, we expect that:

Hypothesis 2: Greater control over leisure time co-varies with leisure-time (a) exercise engagement, (b) less alcohol consumption, and (c) less high sugar, high fat food consumption.

Summarizing our within-person theorizing, we argue that control over leisure time is a mechanism linking evening family demands to leisure-time health behaviors in working sole mothers. Specifically, drawing on the TPB (Ajzen, 1991) and theory surrounding leisure-time perceptions of control (Sonnentag & Fritz, 2007), we expect that evening family demands co-vary with lower perceived control over leisure time. Given the centrality of control to behavioral engagement in TPB, we expect that this control over leisure time co-varies with the likelihood of exercise engagement, as well as the amount of alcohol and high sugar, high fat food that is consumed, during leisure time. Thus, to summarize, we expect that:

> **Hypothesis 3:** Evening family demands indirectly influence leisure-time (a) exercise engagement, (b) alcohol consumption, and (c) high sugar, high fat food consumption via control over leisure time.

We also argue that one's trait-level temporal focus shapes how daily experiences are viewed, which has implications for leisure-time control perceptions. Specifically, we expect adoption of a present-focused time perspective (Shipp et al., 2009) to weaken the negative association of evening family demands with control over leisure time. Present-focused individuals use current resources and information to focus on and manage current demands effectively (Nadkarni & Chen, 2014). Accordingly, these individuals may be better able to manage family demands and feel more empowered to take control over their time when facing demands. In support, similar cognitive strategies that aim to increase a focus on the present (e.g., mindfulness; Brown et al., 2003) help people navigate stressors by controlling cognitions and affect when facing demands (Sala et al., 2020). Ajzen (1991) posits control is determined by access to resources and opportunities needed to engage in behaviors. Thus, individual differences that help to build or retain resources in the face of family demands likely co-vary with greater

perceived control, consistent with evidence that personal characteristics can alter relationships of central TPB constructs with downstream criteria (e.g., Hershberger et al., 2018). Because present focus allows individuals to focus and use current resources efficiently (Nadkarni & Chen, 2014), it is likely to curb the daily detrimental association of daily family demands with control. Accordingly, we predict that:

Hypothesis 4: The indirect effects of evening family demands on leisure-time (a) exercise engagement, (b) alcohol consumption, and (c) high sugar, high fat food consumption via control over leisure time are conditional on trait present-focused time perspective, such that higher present-focused time perspective weakens the negative association of evening family demands with control over leisure time.

Method

Procedure and Sample

Working sole mothers in the United States were recruited for a seven-day study of work and home experiences. Participants were required to be: (1) female, (2) at least 21 years old, (3) working at least 32 hours per week in a paid job, (4) living at least 50% of the time with at least one dependent child under the age of 18, (5) not married or living with a romantic partner, and (6) not working overnight or rotating shifts. Interested participants contacted one of two research center sites in the Southeastern United States, after which they were e-mailed an online *baseline survey* containing an informed consent, inclusion criteria, demographics, and a trait measure of present-focused time perspective. Those who completed the baseline survey then engaged in a seven-day daily survey period (Monday – Sunday), during which they were asked to complete a *morning survey* (available 6 a.m. – 10 a.m.) containing retrospective reports of the previous

day's health behaviors and a *bedtime survey* (available 9 p.m. – 1 a.m.) containing reports of

evening family demands and control over leisure time each day[2].

A total of 131 participants accessed the baseline survey. We removed 13 participants who

did not meet the eligibility criteria or provided no daily responses and 16 participants who failed

one or more of three attention check items or responded to the baseline survey in less than 10

minutes. We also removed all daily observations that failed an IP address fraud screen or that

were provided more than four hours after the daily survey signal. Finally, we removed four daily

observations with missing data on a predictor variable ($N = 102$, 515 within-person observations;

72.1% daily-survey completion rate)[3].

Participants were 36.36 years old ($SD = 8.60$) and worked 41.16 hours per week ($SD = 6.27$) on average. The majority of participants were White (63.7%), while the remaining

participants were predominately either Black or African American (27.5%) or Hispanic or Latinx

(7.8%). The majority of participants had one child at home (62.7%), while the remaining

participants had two (23.5%), three (11.8%), or four (2.0%) children at home. Participants

reported averaging 35.34 hours per week on childcare ($SD = 21.38$) and 8.74 hours per week on

other household responsibilities (e.g., cleaning, cooking, shopping; $SD = 9.28$).

Measures[4]

Evening Family Demands (Bedtime Survey). Family demands were measured with five

items from Marks and MacDermid (1996) adapted for day-level measurement. A sample item is

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[2] We temporally separated measurements of health behaviors from assessments of family demands and control over leisure time to mitigate common method bias concerns (Podsakoff et al., 2003).

[3] Results of a Monte Carlo power analysis (Muthén & Muthén, 2002) with 10,000 repetitions indicated that the statistical power to detect a medium sized effect at this Level 1 sample size, Level 2 sample size, and missing data rate ranged from .84 for the hypothesized cross-level interaction (i.e., the test of Hypothesis 4) to .98 for the hypothesized within-person direct effect relationships (i.e., the tests of Hypotheses 1 and 2).

[4] All items used to measure focal and statistical control variables are presented in the Supplemental Online Appendix.

"I had to do things for my child(ren) that I really did not have the time or energy for" (α = .76 -

.87; average α = .83). Participants responded to each item with reference to the current evening

on a 5-point Likert-type scale (1 = *Strongly disagree*; 5 = *Strongly agree*).

  Evening Control Over Leisure Time (Bedtime Survey). Control over leisure time was

evaluated with four-items from the Recovery Experiences Questionnaire (Sonnentag & Fritz,

2007). A sample item is "I felt like I could decide for myself what to do" (α = .77 - .87; average

α = .83). Participants answered each item with reference to the current evening on a 5-point

Likert-type scale (1 = *Strongly disagree*; 5 = *Strongly agree*).

  Leisure-Time Health Behaviors (Next-Morning Survey Retrospective Report).

Participants provided a retrospective report of their previous evening's health behaviors in the

morning survey each day. Specifically, participants were prompted to reflect on their experiences

during their evening yesterday and then asked to report (1) whether they exercised, (2) how

many servings of alcohol they consumed, and (3) how many servings of a variety of high sugar,

high fat foods they consumed. Leisure-time exercise was measured with a binary question asking

participants to indicate if they did or did not exercise[5]. Leisure-time alcohol consumption was

measured using a single item that asked participants to indicate how many servings of alcohol

they consumed and provided a description of a serving of alcohol. Response options ranged from

"I did not consume alcohol" to "5 or more servings". Leisure-time consumption of high sugar,

high fat foods was measured with six items describing different categories of such foods, with

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[5] Participants also answered supplemental questions on exercise type, duration, and intensity, consistent with the physical activity measurement recommendations of Calderwood et al. (2016). Exercise episodes were 36 minutes long on average (*SD* = 15.33), with an average of almost 20 minutes (*M* = 19.66, *SD* = 21.28) per exercise episode spent at moderate-to-vigorous intensity levels that may yield greater exercise benefits (Rost et al., 2021). Approximately 94.1% of exercise episodes lasted at least 15 minutes. This bolsters our conclusion that participants construed this question to represent engagement in intentional and goal directed exercise (see Calderwood et al., 2021), rather than physical activity more broadly.

participants indicating how much of each category of food they consumed on a 6-point Likert-type scale (1 = *I did not eat this*; 6 = *5 or more servings*)[6]. A sample category is "sugary foods (e.g., chocolate, syrup, pastries, cake)."

Present-Focused Time Perspective (Baseline Survey). Present-focused time perspective was measured using four-items from the Temporal Focus Scale (Shipp et al., 2009). A sample item is "I focus on what is currently happening in my life" (α = .84). Participants responded on a 7-point Likert-type scale (1 = *Never*; 7 = *Constantly*).

Analytic Approach

We tested our hypotheses using multilevel path analysis in MPlus Version 8.4 (Muthén & Muthén, 1997-2017), implementing Bayesian estimation (Asparouhov & Muthén, 2019). The model was specified with evening family demands predicting control over leisure time, which in turn predicted leisure-time exercise, alcohol consumption, and consumption of high sugar, high fat foods. Pathways were modeled as random effects with random slope terms, with trait present-focused time perspective entered as a cross-level moderator of the first-stage evening family demands – control over leisure time relationship. Trait present-focused time perspective was also entered as a cross-level direct effect predictor of evening control over leisure time (see Aguinis et al., 2013). Random slope terms were also correlated (see Bauer et al., 2006). Hypothesized indirect effects and conditional indirect effects were specified as model constraints, with the first-stage moderated mediation evaluated using the approach of Preacher et al. (2006). We note that Bayesian estimation decomposes within- and between-person variance using latent-mean centering (Asparouhov & Muthén, 2019), which controls for between-person variance when

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[6] We did not calculate internal consistency for the consumption of high sugar, high fat foods composite because this scale represents a formative construct.

estimating within-person relationships and controls for within-person variance when estimating between-person relationships.

We evaluated Hypotheses 1 and 2 by examining the statistical significance of random effect terms indexing the relationships of evening family demands with control and control with the three measured health behaviors, respectively. Hypotheses 3 and 4 were tested by evaluating the statistical significance of the model constraint terms specified to represent the anticipated indirect and conditional indirect effects linking evening family demands to health behaviors via evening control over leisure time. Significance of parameter estimates in Bayesian estimation is evaluated using a 95% Credibility Interval (*C.I.*), with *C.I.*s that do not contain 0 indicative of significant estimates (Muthén, 2010).

We statistically controlled for day of the week using the day, sine of the day, and cosine of the day when estimating within-person relationships (Gabriel et al., 2019). We statistically controlled for state negative affect (measured in the bedtime survey with 8 items from the Circumplex Emotion Scale; $\alpha = .83 - .88$; average $\alpha = .86$; Barrett & Russell, 1998) when estimating within-person relationships because negative emotionality drives some health-relevant behaviors (Annesi, 2020). We statistically controlled for evening psychological detachment from work when estimating within-person relationships using four-items from the Recovery Experiences Questionnaire ($\alpha = .71 - .82$; average $\alpha = .78$) to partial out the influence of detachment on daily stressor – strain associations (Sonnentag & Fritz, 2007). Finally, we statistically controlled for which research center site participants were drawn from when estimating between-person relationships[7].

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[7] We computed an alternative model in which no statistical control variables were included for comparative purposes. Results were robust when comparing the original hypothesized model with statistical control variables included to this alternative model with one exception, which was that the relationship linking evening control over

Results

Means, standard deviations, internal consistency estimates, and inter-correlations for all study variables (including control variables) are presented in Table 1. We computed an unconditional model to ensure within-person variability in all variables measured at Level 1. Results indicated that 36.9% - 76.0% of the variability in these variables was within-person, justifying the use of multilevel modeling.

Table 2 displays coefficient estimates, posterior *SD* estimates, and 95% *C.I.*s, while coefficient estimates are presented in Figure 1. Supporting Hypothesis 1, evening family demands negatively co-varied with control over leisure time (γ = -.76, Posterior *SD* = .21, 95% *CI* = [-1.17, -.34]). In turn, this control positively co-varied with leisure-time exercise (γ = .65, Posterior *SD* = .32, 95% *CI* = [.09, 1.35]), supporting Hypothesis 2a. We had no evidence to suggest that evening control related to leisure-time alcohol consumption (γ = .12, Posterior *SD* = .10, 95% *CI* = [-.06, .32]) or high sugar, high fat food consumption (γ = -.29, Posterior *SD* = .22, 95% *CI* = [-.70, .14]), yielding no support for Hypotheses 2b and 2c.

Supporting Hypothesis 3a, evening family demands were negatively, indirectly associated with leisure-time exercise via control over leisure time (γ = -.49, Posterior *SD* = .28, 95% *CI* = [-1.16, -.07]). We had no evidence to suggest that family demands were associated with leisure-time alcohol consumption (γ = -.08, Posterior *SD* = .08, 95% *CI* = [-.26, .06]) or high sugar, high fat food consumption (γ = .23, Posterior *SD* = .17, 95% *CI* = [-.08, .61) via control over leisure time, yielding no support for Hypotheses 3b or 3c.

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leisure time to alcohol consumption was statistically significant without control variables included (γ = .26, Posterior *SD* = .09, 95% *C.I.* = [.08, .45]), but not statistically significant when including statistical controls (γ = .12, Posterior *SD* = .10, 95% *CI* = [-.06, .32]). Interestingly, the supported relationship in the model without statistical controls ran contrary to our expectations (i.e., greater control over leisure time co-varied with more, rather than less, leisure-time alcohol consumption).

Analyses pertaining to hypothesized conditional indirect effects are in Table 3.

Supporting Hypothesis 4a, trait present-focused time perspective moderated the evening family

demands – control over leisure time relationship (γ = .08, Posterior *SD* = .03, 95% *CI* = [.01,

.14]), such that the relationship was significant and negative at low (i.e., -1 *SD*) levels of present-

focused time perspective (γ = -.45, Posterior *SD* = .14, 95% *CI* = [-.73, -.18]), but not significant

at high (i.e., +1 *SD*) levels of present-focused time perspective (γ = -.29, Posterior *SD* = .15, 95%

CI = [-.57, .01]) (see Figure 1). The difference between these simple slopes was statistically

significant (γ = -.17, Posterior *SD* = .07, 95% *CI* = [-.31, -.02]). The negative indirect effect of

evening family demands on leisure-time exercise via control over leisure time was also

supported at low (γ = -.30, Posterior *SD* = .18, 95% *CI* = [-.75, -.04]), but not at high (γ = -.19,

Posterior *SD* = .15, 95% *CI* = [-.57, .01]), levels of present-focused time perspective. Thus, the

hypothesized moderated mediation for the exercise criterion was supported. In contrast, we had

no evidence to suggest that evening family demands were associated with leisure-time alcohol

consumption (Low Present-Focus γ = -.04, Posterior *SD* = .05, 95% *CI* = [-.15, .04]; High

Present-Focus γ = -.02, Posterior *SD* = .04, 95% *CI* = [-.11, .04]) or high sugar, high fat food

consumption (Low Present-Focus γ = .14, Posterior *SD* = .11, 95% *CI* = [-.04, .39]; High

Present-Focus γ = .09, Posterior *SD* = .09, 95% *CI* = [-.03, .30]) via control over leisure time as a

function of trait present-focused time perspective, yielding no support for Hypotheses 4b and

4c[8].

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[8] For comparison purposes, we also computed an alternative correlated random effects model, which relaxes the assumption that the random intercept is uncorrelated with the regressors (a commonly violated assumption in multilevel modeling that creates an endogeneity problem when violated; Antonakis et al., 2021) by including cluster means for predictor variables as statistical controls. The pattern of results in this alternative correlated random effects model was fully robust with the original test of the hypothesized model. More specifically, within this alternative correlated random effects model, we still observed evening family demands to negatively co-vary with control over leisure time (γ = -.79, Posterior *SD* = .22, 95% *CI* = [-1.22, -.36]), which in turn was positively related to leisure time exercise engagement (γ = .66, Posterior *SD* = .31, 95% *CI* = [.10, 1.31]). The negative indirect effect

Supplemental Analyses

We conducted several supplemental analyses to better understand the leisure-time exercise behaviors of working sole mothers. On every day that participants reported engagement in an exercise episode, they were asked to indicate what type of exercise they had engaged in from a list of ten workouts (*biking, running, crossfit, swimming, hiking, weight lifting, spinning, yoga, walking, other*), with the option to select multiple workout types. For every workout type selected, they then reported the number of minutes spent in light (little sweating; easy to talk), moderate (moderate sweating; difficult to talk), and vigorous (lots of sweating; impossible to talk) physical activity during this exercise episode. Evaluating just the days in which exercise was reported ($n = 170$), the most frequent workout types were walking (49.2% of exercise episodes), running (30.8%), yoga (26.7%), and biking (12.5%). We also computed a series of three sequential supplemental models in which we substituted the dichotomous exercise criterion variable from the original hypothesized model with the number of minutes spent in light, moderate, and vigorous physical activity, to evaluate if control over leisure time related to the combined duration and intensity of exercise. However, we did not obtain evidence to suggest that the amount of time spent at each exercise intensity level related to control over leisure time (Light $\gamma = -3.34$, Posterior $SD = 5.32$, 95% $CI = [-13.74, 7.42]$; Moderate $\gamma = 4.23$, Posterior $SD = 5.85$, 95% $CI = [-7.03, 16.22]$; Vigorous $\gamma = -7.79$, Posterior $SD = 5.75$, 95% $CI = [-19.19, 3.38]$). Thus, our results appear to suggest that control over leisure time supports engagement in exercise, rather than a specific combined duration and intensity of exercise.

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of evening family demands on leisure-time exercise via control over leisure time also remained statistically significant in this alternative statistical control model ($\gamma = -.52$, Posterior $SD = .29$, 95% $CI = [-1.19, -.07]$). Finally, present-focus continued to moderate the first-stage pathway in this mediated model ($\gamma = .08$, Posterior $SD = .03$, 95% $CI = [.01, .15]$), yielding a conditional indirect effect in which the negative indirect effect of evening family demands on leisure-time exercise was observed at low ($\gamma = -.31$, Posterior $SD = .18$, 95% $CI = [-.73, -.04]$), but not at high ($\gamma = -.19$, Posterior $SD = .14$, 95% $CI = [-.53, .00]$), levels of present-focus.

In addition to this effort to better understand the nature of leisure-time exercise engagement for working sole mothers, we also gave consideration to whether a lack of leisure-time availability served as an alternative explanation for perceptions of control over leisure time that may explain the core findings in our model. During the daily survey period, we had asked participants to report the amount of time that they spent pursuing work-related activities, household activities, and childcare activities each evening. Each of these activities are considered to require effort (Sonnentag, 2001) and consume personal resources (e.g., Ten Brummelhuis & Bakker, 2012), and as such may reflect salient time demands that could undermine perceptions of control over leisure time. To evaluate this possibility, we computed an alternative statistical control model in which time spent in these three categories of activity was entered as a predictor of control over leisure time. Our conclusions were identical with or without these additional controls in the model, in that evening family demands were still observed to co-vary with diminished control over leisure time (γ = -.73, Posterior *SD* = .21, 95% *C.I.* = [-1.14, -.31]), which in turn related to a greater likelihood of evening exercise (γ = .64, Posterior *SD* = .28, 95% *C.I.* = [.07, 1.20]). The originally observed indirect effect of evening family demands on leisure-time exercise via evening control (γ = -.47, Posterior *SD* = .26, 95% *C.I.* = [-1.08, -.06]) was also still supported in this alternative statistical control model, as was the cross-level moderation of present-focus on the first stage evening family demands – evening control relationship (γ = .07, Posterior *SD* = .03, 95% *C.I.* = [.01, .14]). Thus, our results appear robust to an alternative explanation centered on a lack of leisure time availability.

Discussion

We drew on the TPB (Ajzen, 1991) to hypothesize relationships linking evening family demands to leisure-time health behaviors (i.e., exercise, alcohol consumption, consumption of

high sugar, high fat foods) in a priority, understudied sample of working sole mothers. Our results demonstrated that evening family demands are associated with reduced leisure-time exercise via alterations in perceived control over leisure time. Consistent with our suggestion that subjective views of time may factor into these associations, this indirect association was stronger for those lower in trait present-focused time perspective. Thus, higher levels of present-focus appear to buffer the detrimental influence of evening family demands on exercise behaviors in working sole mothers by altering the implications of these demands for perceptions of control over leisure time. In contrast, we had no evidence to suggest that control over leisure time influenced alcohol use or the consumption of high sugar, high fat foods, which suggests the possibility that these control perceptions are more relevant to some health behaviors than others.

Theoretical Implications

This study reveals *how* daily family demands relate to leisure-time exercise engagement, with control positioned as a potentially critical resource that can be harnessed to support daily exercise (Ajzen, 1991; Ten Brummelhuis & Bakker, 2012). Most research conducted in organizational contexts to date has focused on the implications of exercise for downstream work-relevant criteria, with comparatively little attention to predictors of exercise engagement (Calderwood et al., 2016; 2021). Our findings support the theorized connection between high family demands and a reduced sense of control (Ozer, 1995; Rosenfield, 1989), while also showing that lower levels of control co-vary with a reduced likelihood of leisure-time exercise engagement. This finding also builds theoretical knowledge by identifying daily and individual cognitive factors that relate to control, moving beyond demographic factors and personality (Ajzen, 2011).

Interestingly, control did not seem to play a role in predicting the consumption of alcohol or high sugar, high fat foods within our sample of working sole mothers. Consumption of alcohol and high sugar, high fat foods are less physically effortful and likely less time consuming than engaging in exercise. Furthermore, these behaviors may be easier to perform while still meeting family demands (e.g., drinking a glass of wine while making dinner, snacking while watching television with children). In total, our pattern of results leaves open the possibility that family demands may only operate through control over leisure time to influence health behaviors that are more effortful, time consuming, or difficult to engage in while meeting family demands. As many applications of the TPB to health behavior prediction have focused on the prediction of a single health behavior in a given study (e.g., exercise, alcohol, healthy eating; Conner et al., 1999; 2002; Hausenblas et al., 1997), we encourage future research to directly compare the relative contributions of alternative TPB components to multiple health behaviors that are considered and modeled simultaneously.

Our findings also suggest that perceptions of control that may extend from a working sole mother's subjective view of time are relevant to how evening family demands influence leisure-time health behaviors. Although subjective time is a well-recognized individual difference that shapes cognition, behavior, and affect, empirical data on this topic, and particularly the implications of a present-focused view of time, remains scant (Levasseur et al., 2020; Shipp & Aeon, 2019). When considering health criteria, the limited empirical work that is available suggests that present focus may be a double-edged sword which can have positive health and wellness implications (e.g., Shipp et al., 2009), but also motivate riskier behaviors as it lessens a focus on potential longer-term consequences (Keough et al., 1999; Zimbardo et al., 1997). Our study expands this work by considering present focus as a factor that changes how working sole

mothers react to daily family demands, ultimately enabling greater perceived control over leisure time that can be used to support health behaviors for more present-focused individuals. This observation highlights a novel theoretical role for present-focus in health, while also lending support to the potential positive health implications of a present-focus.

Practical Implications

Working sole mothers face substantial barriers to maintaining their overall health and pursuing daily health behaviors (e.g., Dziak et al., 2010; Robinson et al., 2018). In particular, working sole mothers are frequently called upon to juggle competing work and family demands in the context of lower social support and fewer financial resources, on average, than their partnered counterparts (Baxter & Renda, 2011; Robinson et al., 2018). Further, in a broader sense, family demands are recognized to be physically and psychologically taxing (Nordenmark, 2004). Thus, finding avenues to support the pursuit of restorative leisure-time health behaviors (Sonnentag, 2001) in working sole mothers may be particularly impactful to reducing occupational health disparities that these employees face. Moreover, given the centrality of control over leisure time to daily family demand – exercise associations, trying to bolster perceptions of control via direct training (e.g., recovery training programs; Hahn et al., 2011) or broader steps to build and restore perceptions of autonomy (e.g., Anicich et al., 2020) in working sole mothers may also mitigate these disparities. We hope that future scholars and practitioners will build on our work to develop and apply control-focused interventions to support health behavior engagement in this underserved group.

Our results also highlight that temporal focus may be a useful lens to understand health behavior engagement. This finding is noteworthy from a practical perspective, as some working sole mothers may face more limited tangible and energetic resources (e.g., support, money, time,

energy; Robinson et al., 2018), but could still harness perceived control as a contextual resource to maintain and support their health (Ten Brummelhuis & Bakker, 2012). Although largely stable, there is some evidence that temporal focus can change over time (Shipp & Aeon, 2019). Interventions that aim to draw greater attention and awareness to present experiences, such as mindfulness training (Creswell, 2017), may be a beneficial and worthwhile investment to increase health behaviors in working sole mothers. Interventions of this nature may be particularly enticing for this population because relatively brief (3 – 10 min of practice per day) and accessible (cell phone application based) trainings have proven efficacious (e.g., Lindsay et al., 2019), which could facilitate working sole mothers' ability to incorporate the steps of these interventions into their everyday lives. Furthermore, because present-focus is an individual difference (Shipp et al., 2009), measures of this view of subjective time may be useful for identifying working sole mothers who may be more likely to experience lower levels of health behaviors in relation to daily family demands. In combination, the practical implications of this study will ideally guide future research and applications to understand how to reduce health disparities that working sole mothers face.

Strengths, Limitations, and Future Directions

Though our study has numerous strengths (e.g., repeated measures design, sampling in a large, understudied population), there are also several limitations that contextualize our conclusions. First, while sampling from working sole mothers was an intentional choice, the generalizability of our findings is likely reduced as a consequence of this decision. Additionally, this sampling strategy had the potential to restrict range on focal variables relative to what would have been observed in the broader population (Dahlke & Wiernik, 2020), though we note that sample statistics from our study were roughly comparable to what has been observed in prior

research[9]. There may be other important modifiers and contributors to health behaviors to consider when extending our findings to dual-parent households, such as daily support or caregiving trade-offs between parents (e.g., Hirschi et al., 2019). Furthermore, whether and how family demands influence control perceptions and health behaviors in other contexts in which family demands might be high (e.g., dependent adult relatives, ill relatives or household members) may be important to consider. It will also be important to replicate our findings in broader samples of employees who combine to represent a wide range of family demands, perceptions of evening control, and rates of health behavior engagement. Such efforts will allow for the establishment of the robustness of our conclusions outside of the working sole mothers context, while also better allowing for the evaluation of working sole mothers as a subpopulation of employees who may have high rates of family demands that relate to leisure time health behavior engagement.

Additionally, our study focused on daily family demands in a general sense, but these demands may vary in the extent to which they are perceived as hindering versus challenging (e.g., Cavanaugh et al., 2000; Webster et al., 2011). Furthermore, family demands that are more time-based (i.e., take up time or make time more scarce; Johnson & Allen, 2013) may be more likely to serve as an impediment to health behaviors that require a more substantial time investment (e.g., exercise), relative to behaviors that can more easily be multi-tasked (e.g., drinking and eating). As these examples suggest, there is a need to more comprehensively understand what specific types of family demands tend to undermine control perceptions and influence downstream health behaviors.

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[9] Results available from the first author by request.

We chose to focus on the three health behaviors of leisure-time exercise, alcohol consumption, and high sugar, high fat food consumption given their commonality, broad importance, and potential relationships to perceptions of control under the TPB (Ajzen, 1991; Calderwood et al., 2021; Frone, 2019; Kushner & Choi, 2010). However, the model evaluated in this study may be relevant to other widely studied health behaviors as well, such as smoking and sleep. It may also prove useful to see whether perceptions of control over leisure time filter into behaviors relevant to the health of other family members, such as the preparation of nutritious dinners and/or family engagement in physical activities (Johnson & Allen, 2013; Cho & Allen, 2013). In addition, while we grounded our theorizing in TPB (Ajzen, 1991), we did not specifically measure or model the behavioral intentions to engage in health behaviors. Thus, while we were able to explore direct associations of perceived control and behavior hypothesized under the TPB (Ajzen, 1991), we were unable to evaluate the role of intentions as a mediator between control over leisure time and health behavior.

Finally, our daily survey approach is not sufficient to support causal inferences. Thus, we cannot conclude that family demands cause a reduction in control over leisure time, nor can we assert that this control over leisure time causes an increase in evening exercise. Because control over leisure time is considered a recovery experience (i.e., a psychological appraisal of leisure time; Sonnentag & Fritz, 2007), randomized controlled trials of recovery training programs (e.g., Hahn et al., 2011) may allow for causal relationships of control and health behaviors to be established in future research. In contrast, given difficulties in directly and realistically experimentally manipulating family demands, vignette studies may show promise to better underpin causal relationships linking these demands to perceptions of control (Greenhaus & Powell, 2003).

Conclusion

We sought to understand the process through which evening family demands influence leisure-time health behaviors in a sample of working sole mothers who may face numerous barriers to maintaining their health from day-to-day. Our findings suggest that perceptions of control over leisure time are central to understanding how daily family demands influence exercise engagement, while also demonstrating that a present-focused time perspective may mitigate the detrimental influence of these family demands on this health behavior by altering perceptions of control. It is our hope that these findings will motivate future efforts to support health behaviors in working sole mothers and other priority populations facing significant family demands, particularly from the perspective of developing interventions to reduce health disparities that members of these populations encounter.

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Table 1

Means, Standard Deviations, Correlations, and Internal Consistency Estimates for Measured Study Variables

	M	*SD*	1	2	3	4	5	6	7	8	9
1. Negative Affect at Bedtime	1.63	.67	(.86)	-.22*	.25*	-.46**	-.35**	-.26*	.17	-	-.22*
2. Evening Detachment	3.45	.85	-.27**	(.78)	-.40**	.59**	.07	.02	.09	-	.14
3. Evening Family Demands	2.87	.89	.40**	-.25**	(.83)	-.28**	.15	-.18	-.03	-	-.01
4. Evening Control	3.88	.78	-.25**	.28**	-.33**	(.83)	.20	-.02	-.06	-	.23*
5. Evening Exercise (1 = *No*; 2 = *Yes*)	1.44	.50	.03	.04	.01	.10*	-	.04	-.49**	-	.17
6. Evening Alcohol Consumption	1.44	.90	.01	.11*	-.01	.09	-.05	-	-.17	-	.12
7. Evening Consumption of High Sugar, High Fat Foods	2.35	1.96	-.07	-.04	-.05	-.06	-.02	.10	-	-	-.02
8. Day of the Week	3.97	1.96	-.27**	.15**	-.26**	.20**	-.09	.12*	-.01	-	-
9. Present-Focused Time Perspective	5.10	1.09	-	-	-	-	-	-	-	-	(.84)

Note. $N = 102$. The number of day-level observations available for statistical analysis ranged from 387 (for inter-relationships of evening control with leisure-time food and leisure-time alcohol consumption, the latter of which were measured retrospectively in a next-morning survey) to 516 (for the inter-relationship of evening family demands with evening negative mood). Person-level correlations are reported above the diagonal, while day-level correlations are reported below the diagonal. Day-level correlations are estimated from person-mean centered variables. Internal consistency estimates are provided in parentheses.
* $p < .05$; ** $p < .01$.

Table 2

Multilevel Path Model Results

Predictor	Evening Control			Evening Exercise (1 = *No*; 2 = *Yes*)			Evening Alcohol Consumption			Evening High Sugar, High Fat Food Consumption		
	γ	Posterior SD	95% *CI*	γ	Posterior SD	95% *CI*	γ	Posterior SD	95% *CI*	γ	Posterior SD	95% *CI*
Intercept (Threshold)	4.38*	.59	[3.18, 5.50]	(1.59)	(.90)	([-.14, 3.42])	1.70*	.40	[.71, 2.35]	2.13*	.86	[.66, 3.94]
Level 1 Predictors and Controls												
Day of the Week	.02	.02	[-.01, .05]	.13	.13	[-.14, .39]	-.10	.06	[-.21, .02]	.10	.12	[-.14, .33]
Sine	-.01	.05	[-.10, .08]	.37	.22	[-.08, .81]	-.27*	.10	[-.46, -.08]	.08	.19	[-.30, .46]
Cosine	-.01	.03	[-.07, .06]	-.49	.26	[-1.00, .03]	.25*	.11	[.02, .45]	-.18	.22	[-.61, .26]
Negative Affect at Bedtime	-.13*	.05	[-.23, -.03]	-.46	.26	[-.95, .09]	.00	.08	[-.16, .17]	.01	.19	[-.38, .38]
Evening Detachment	.19*	.03	[.12, .25]	.10	.17	[-.24, .44]	.03	.07	[-.09, .16]	.05	.14	[-.22, .32]
Evening Family Demands	-.76*	.21	[-1.17, -.34]	.30	.17	[-.04, .64]	.00	.06	[-.12, .12]	-.14	.15	[-.43, .15]
Evening Control	-	-	-	.65*	.32	[.09, 1.35]	.12	.10	[-.06, .32]	-.29	.22	[-.70, .14]
Level 2 Predictors and Controls												
Research Center Site	.02	.21	[-.37, .42]	-	-	-	-	-	-	-	-	-
Present-Focused Time Perspective	-.13	.09	[-.30, .05]	-	-	-	-	-	-	-	-	-
Cross-Level Interaction and Controls												
Research Center Site	.13	.08	[-.03, .29]	-	-	-	-	-	-	-	-	-
Present-Focused Time Perspective	.08*	.03	[.01, .14]	-	-	-	-	-	-	-	-	-

Note. N = 102. There were 515 day-level time points available for statistical analysis (*n* = 515). Hypothesized relationships were modeled as random effects with random slope terms. Reported coefficients are unstandardized. Within- and between-person variance were decomposed using latent centering via Bayesian estimation. Estimates of slope variance were significant for all hypothesized relationships (Family demands – control [S1] γ = .04; Control – Exercise [S2] γ = .58; Control – Alcohol Consumption [S3] γ = .19; Control – consumption of high sugar, high fat foods [S4] γ = .66; all *p*s < .05), bolstering our decision to model hypothesized relationships as random effects with random slope terms. Random slope co-variances were estimated as follows: S1 – S2 *r* = -.01; S1 – S3 *r* = .01; S1 – S4 *r* = .02; S2 – S3 *r* = .04; S2 – S4 *r* = -.38; S3 – S4 *r* = .00; all *ns*. The model explained 14.0% of the within-person variance in evening control, 24.3% of the within-person variance in leisure-time exercise, 11.8% of the within-person variance in leisure-time alcohol consumption, and 8.2% of the within-person variance in leisure-time high sugar, high fat food consumption. The model explained 11.5% of the between-person variance in evening control. Significant 95% Credibility Intervals (*C.I.*s) that do not include 0 are marked with an asterisk.

Table 3

Tests of Conditional Indirect Effects Linking Evening Family Demands to Leisure-Time Health

Behaviors via Control Over Leisure time

Pathway	γ	Posterior *SD*	95% *CI*
Low Present-Focus			
Family demands → Control → Exercise	-.30*	.18	[-.75, -.04]
Family demands → Control → Alcohol	-.04	.05	[-.15, .04]
Family demands → Control → Eating	.14	.11	[-.04, .39]
High Present-Focus			
Family demands → Control → Exercise	-.19	.15	[-.57, .01]
Family demands → Control → Alcohol	-.02	.04	[-.11, .04]
Family demands → Control → Eating	.09	.09	[-.03, .30]

Note. $N = 102$. There were 515 day-level time points available for statistical analysis ($n = 515$). Reported coefficients are unstandardized. Statistically significant credibility intervals (*C.I.*s) that do not include zero are marked with an asterisk.

Figure 1

Empirical Test of a Conceptual Model of How Family Demands Influences Health Behaviors
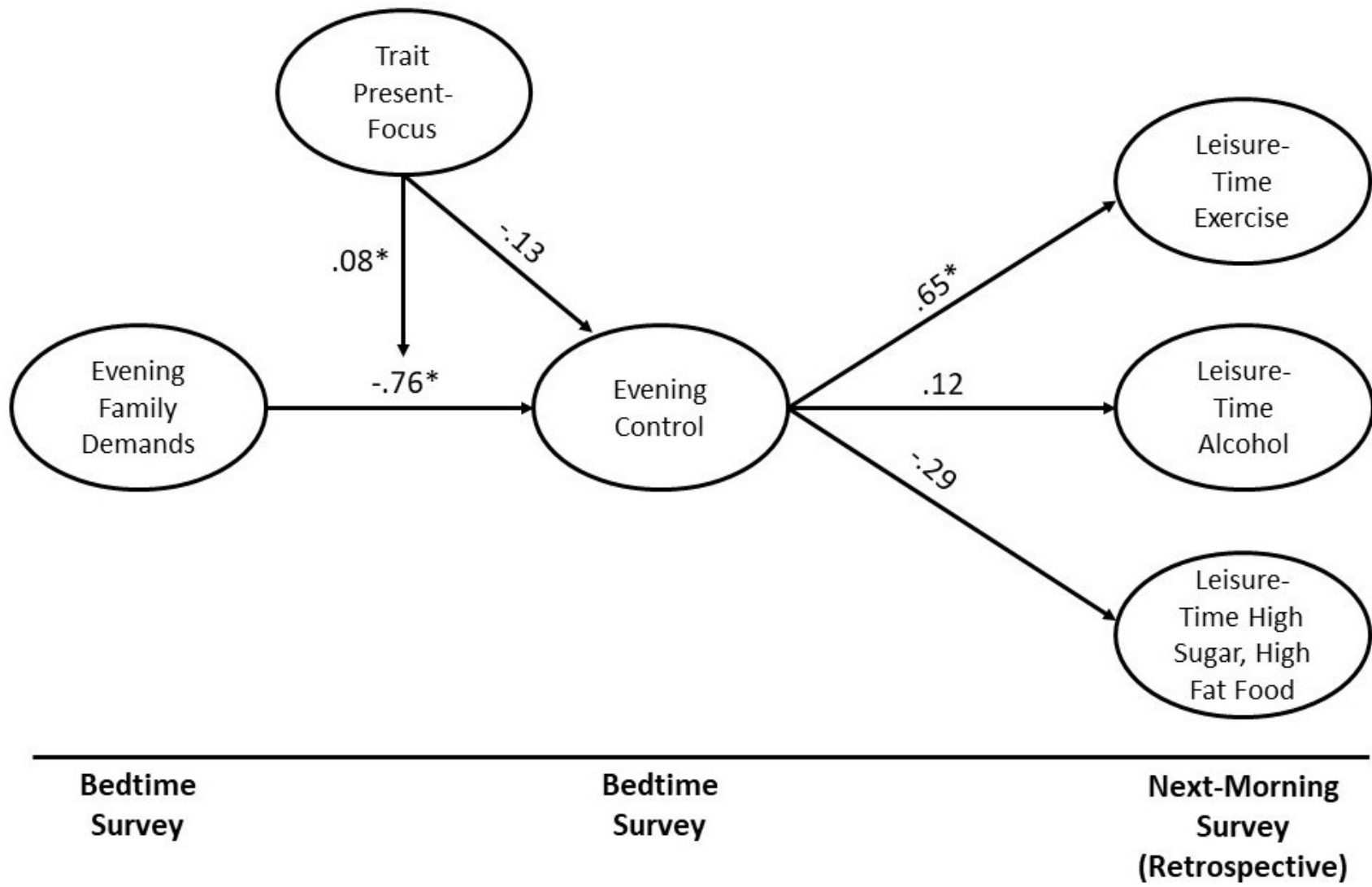
Figure 2

Cross-Level Moderation of the Evening Family Demands – Evening Control Over Leisure Time

Relationship by Trait Present-Focused Time Perspective