Stop and Go, Where is My Flow? How and When Daily Aversive Morning Commutes Are Negatively Related to Employees' Motivational States and Behavior at Work

Fabiola H. Gerpott*
WHU – Otto Beisheim School of Management, Management Group
Erkrather Str. 224a, 40233 Duesseldorf, Germany, fabiola.gerpott@whu.edu

Wladislaw Rivkin*
Trinity Business School, Trinity College Dublin, Dublin 2, Ireland, RIVKINW@tcd.ie

Dana Unger
University of East Anglia, Norwich Business School
Norwich Research Park, Norwich, NR4 7TJ, United Kingdom, D.Unger@uea.ac.uk

* Both authors contributed equally

Correspondence concerning this article should be addressed to Fabiola H. Gerpott, WHU – Otto Beisheim School of Management, Erkrather Str. 224a, 40233 Duesseldorf, Germany. Email: fabiola.gerpott@whu.edu, phone: +49 176 6461 2659

There is no specific funding to report for this research. The authors declare that there is no conflict of interest. An earlier version of this paper was presented at the 2019 EAWOP conference in Turin (Italy) and we thank the participants for their insightful feedback.

Abstract

Despite convincing evidence about the general negative consequences of commuting for individuals and societies, our understanding of how aversive commutes are linked to employees' effectiveness at work is limited. Drawing on theories of self-regulation and by extension a conservation of resources perspective, we develop a framework that explains how an aversive morning commute—a resource-depleting experience characterized by interruptions of automated travel behaviors—impairs employees' immersion in uninterrupted work (i.e., flow), which in turn reduces employee effectiveness (i.e., work engagement, subjective performance, and OCB-I). We further delineate theoretical arguments for daily self-control demands as a boundary condition that amplifies this relation and propose the satisfaction of employees' basic needs as protective factors. Two diary studies across 10 workdays (Study 1: 53 employees, 411 day-level data points; Study 2: 91 employees, 719 day-level data points) support most of our hypotheses. Study 1 demonstrates that daily aversive morning commutes negatively affect employees' daily work engagement through lower levels of flow experiences, but only on days with high impulse control demands. In addition, we find initial support that employees' general autonomy and competence needs satisfaction attenuate this interaction. Study 2 rules out alternative mechanisms (negative affect, tension), demonstrates ego depletion as an additional mediator of the relation between aversive morning commutes and work effectiveness and replicates the hypothesized three-way interaction for daily competence need satisfaction. We critically discuss the findings and reflect on corporate interventions, which may allow people to more easily flow to and at work.

Keywords: commuting; conservation of resources; flow experience; self-regulatory resources; employee effectiveness

Stop and Go, Where is My Flow? How and When Daily Aversive Morning Commutes Are Negatively Related to Employees' Motivational States and Behavior at Work

Notwithstanding attempts to promote teleworking (Browne, 2018) and exceptional circumstances during the COVID-19 pandemic (Thompson, 2020), more than 90% of employees commute to work every day, with average commuting times steadily increasing (Federal Statistical Office Germany, 2012; Ingraham, 2017; Office for National Statistics UK, 2014; Zhu et al., 2017). Given the high prevalence of commuting, you are likely one of those people who traveled from home to work this morning. How did you experience your morning commute? Unfortunately, on some days, you may answer this question by describing aversive commute experiences, such as referring to your morning commute as "a nightmare" (Ye & Ma, 2019) or "hell" (Gerdemann, 2019) or telling "tales of a frustrated commuter" (Seay, 2019). Your commute may have been slow or unpleasant or may have knocked you out of rhythm, for example, because the traffic flow was interrupted by stop-and-go driving. Indeed, Kahneman and Krueger (2006) suggest that people's morning commutes tend to be among their least enjoyable daily activities. You can probably vividly imagine being drained when arriving at work after such an aversive commute experience. What does your organization do to help you overcome this feeling and facilitate a smooth transition into the workday? Most likely "Not much."

The prevalence of commuting as a necessary but often unpleasant experience has prompted researchers from various fields to study its consequences for both individuals and societies. For example, previous research has demonstrated the negative effects of commuting on individuals' general health and well-being (Koslowsky, 1997; Lorenz, 2018; Novaco & Gonzalez, 2009; VitalityHealth, 2017). Furthermore, because many employees consider that the time spent commuting to work adds to their overall working hours and thus reduces their hourly wages, scholars have also investigated trade-offs between pay and length of the commute (Dauth & Haller,

2020; Nogland & Small, 1995). On the societal level, research has provided evidence concerning the broader negative impact of commuting on environmental pollution (Coria & Zhang, 2017; Johansson et al., 2017), destruction of the environment through expanding and maintaining infrastructure (Laurance et al., 2009), and traffic congestion (Fosgerau et al., 2018; Wu et al., 2019). Overall, research suggests that commuting is largely harmful for both individuals and societies. However, we cannot draw an equally rich picture of the consequences of commuting for organizations in terms of whether and how employees engage with their daily work.

The lack of awareness of and evidence about the work-related consequences of aversive morning commutes (i.e., negative subjective experiences of impeded goal attainment while traveling from home to work; Stokols et al., 1978) has resulted in most organizations externalizing commuting costs and neglecting the implementation of measures to protect employees from the potentially harmful effects of aversive commutes. To increase organizations' willingness and ability to address this focal topic, there is a need for research that links commuting to organizational effectiveness (Ma & Ye, 2019) and identifies the mechanisms underlying this link. Moreover, identifying contingencies that can reduce the adverse effects of aversive morning commutes could provide managers with specific insights into how they can alleviate the adverse organizational consequences of this somewhat unavoidable stressor through appropriate interventions. Thus, our research seeks to contribute to an emerging conversation about commuting spillover (i.e., interrelationships between commuting and work experiences, Calderwood & Mitropoulos, 2020; Zhou et al., 2017) by examining the mechanisms and boundary conditions of the link between aversive commutes and employee effectiveness.

From a theoretical perspective, a crucial element of an aversive morning commute is that it impedes goal pursuit (i.e., arriving at work on time). In contrast to an uninterrupted commute, which for the most part relies on automated cognitive processing and behaviors (Stokols et al.,

1978), overcoming an aversive morning commute necessitates effortful inhibition of behavioral responses (e.g., abstaining from driving faster and more aggressively) and additional decision-making (e.g., considering alternative routes to work). This core proposition that an aversive morning commute constitutes a goal-inhibiting and resource-depleting experience characterized by a shift from automated toward controlled cognitive processing underlies the conceptual link between an aversive morning commute and employees' immersion in uninterrupted work. In other words, we explicate that a depleting commute spills over to the workplace and reduces the likelihood that employees will lose themselves in fluent peak states of motivation referred to as *flow experiences* (Csikszentmihalyi & LeFevre, 1989). Flow experiences build employees' resources at work and thereby facilitate *work engagement* (i.e., a pervasive positive motivational state that captures the degree to which employees apply their cognitive, physical, and emotional energies to their jobs), in-role behaviors (i.e., *subjective performance*, referring to the perceived effective fulfillment of job duties), and extra-role behaviors (i.e., *intrapersonal organizational citizenship behavior* [OCB-I], which refers to discretionary acts that go beyond job duties) at the end of the workday. These indicators of employee effectiveness have been identified as crucial predictors of organizational functioning (Call & Ployhart, in press; Christian et al., 2011).

Self-regulation (Muraven & Baumeister, 2000) and by extension conservation of resources theory (COR; Hobfoll et al., 2018) provide a framework to delineate the proposed mechanisms and identify contingencies that can modulate the adverse effects of an aversive morning commute. Engaging in self-regulation, consumes individual's regulatory resources resulting in *ego depletion*—a state of reduced regulatory resources (Muraven & Baumeister, 2000). Furthermore, the lack of resources, makes individuals more vulnerable to resource loss and less capable of resource gain (Hobfoll et al., 2018). This is because reduced resources (i.e., ego depletion) trigger a resource protection mode characterized by motivational tendencies to

conserve and protect remaining resources (Chong et al., 2020; Giacomantonio et al., 2014; Muraven et al., 2006). Integrating these propositions, we argue that the depletion of regulatory resources through an aversive commute initiates a daily regulatory resource loss process, which reduces the likelihood of experiencing flow. We further suggest that this resource loss process is exacerbated by additional work-related self-control demands, such as the requirement to inhibit spontaneous, impulsive response tendencies and emotions to maintain controlled, purposeful behavior (i.e., impulse control demands, Schmidt & Neubach, 2007). This moderating effect occurs because coping with self-control demands requires employees to invest regulatory resources, which becomes increasingly difficult when experiencing tendencies to protect and conserve said resources. Thus, coping with self-control demands when in states of ego depletion after an aversive morning commute should result in an overadditive depletion of an employees' regulatory resource pool, which impairs flow experiences and associated employee effectiveness.

COR theory not only outlines loss processes but can also be integrated with self-determination theory (Ryan & Deci, 2000), which states that the satisfaction of basic psychological needs at work (autonomy, competence, and relatedness) enhances intrinsic motivation associated with activities at work that are congruent with deeply held values or one's 'true self' (Ryan & Deci, 2001). This in turn replenishes employees' pool of regulatory resources and thereby facilitates the willingness to invest said resources at work (Deci & Ryan, 2001, 2008; Van den Broeck et al., 2016). Expanding our theoretical framework through self-determination theory, we propose work-related psychological needs satisfaction as a motivational contingency, which counteracts the tendency to conserve regulatory resources through replenishing said resources (Van den Broeck et al., 2016). To summarize, we propose that work-related needs satisfaction can interrupt the daily regulatory resource loss process initiated by an aversive morning commute and exacerbated by work-related self-control demands, which reduces flow experiences and culminates in impaired

employee effectiveness (cf. Figure 1).

Our research aims to make three contributions. First, we identify flow experiences as a central mechanism of the daily link between an aversive morning commute and employee effectiveness. Conceptually, connecting an interrupted travel experience (i.e., an aversive morning commute) with employees' subsequent experiences of fluent, uninterrupted task work (i.e., flow) unites two seemingly disparate streams of research under the umbrella of COR theory. More specifically, by focusing on the role of regulatory resources in the relation between a daily aversive commute and flow experiences, our research expands notions on flow as a psychological state entering which requires the initial investment of regulatory resources but once it is experienced, flow can replenish regulatory resources. Second, based on our integration of self-regulation and COR theory, we consider self-control demands as a moderator of the proposed relationship. Based on the notion that individuals enter a state of regulatory resource protection when feeling depleted, we theorize that having to further self-regulate when experiencing motivational tendencies to conserve resources overtaxes employees' pool of regulatory resources, which manifests in reduced flow experiences. Our research thus outlines the theoretical mechanisms that can explain why coping with multiple self-control demands exhibits overadditive effects (Dang, 2018; Diestel & Schmidt, 2011; van Woerkom et al., 2016). Finally, our research links self-determination theory with a resource protection perspective to theoretically delineate and empirically test the proposition that motivational contingencies can interrupt daily resource loss processes initiated by an aversive morning commute and exacerbated by self-control demands.

Flow as the Link Between an Aversive Morning Commute and Work Engagement

Work-related motivational states refer to a set of energetic forces that determine the intensity, direction, and duration of an employee's efforts toward achieving a goal such as

completing work tasks (Pinder, 2008; Robbins & Judge, 2019). In contrast to traits, motivational states fluctuate between and even within days. We seek to expand our understanding of these day-to-day fluctuations by focusing on aversive morning commutes. Specifically, we draw on self-regulation (Muraven & Baumeister, 2000) and by extension COR theory (Hobfoll, 1989; Hobfoll et al., 2018; Hobfoll & Shirom, 2001) to explicate how an aversive commute reduces an employee's experiences of peak motivation (i.e., flow), that in turn replenishes resources and contributes to more global longer-lasting motivational states at work.

According to self-regulation theory, individuals strive to limit their use of self-regulatory resources, especially when they have depleted some of those resources (Muraven et al., 2006). This ties in with COR theory which suggests that a low availability of resources results in tendencies to conserve remaining resources (Chong et al., 2020; Giacomantonio et al., 2014). The resource-draining experience of an aversive morning commute results in a state of ego depletion (Zhou et al., 2017), which entails that employees subsequently attempt to preserve their remaining regulatory resources. This resource protection mode manifests when employees experience a goal-inhibiting incident and subsequently work in a "state of distractibility [...] that prevents employees from being fully engaged" (Leroy et al., 2020, p. 44). Interruptions require employees to shift from states of automatic cognitive processing that is highly efficient and requires barely any self-regulation towards states of controlled processing that are much more resource-intensive, as they involve conscious planning, decision-making, and monitoring of cognitions and associated behaviors (Baumeister et al., 2000). Due to its regular occurrence, commuting is for most employees a habit that relies foremost on automatic processing (Elfering et al., 2013). However, aversive commute experiences require employees' self-regulation to shift toward controlled cognitive processing (Leroy et al., 2020). For example, employees may need to adapt

daily work plans when arriving later at work or decide during the commute whether to pass on information about potential delays to colleagues. In turn, states of controlled cognitive processing deplete regulatory resources and put employees into a resource protection mode.

This resource protection mode prevents employees from experiencing of positive motivational states at work. Since individuals must invest resources to gain resources (Hobfoll et al., 2018), a resource protection mode can paradoxically prevent flow experiences at work, defined as positive motivational states that manifests in short, intensive peak experiences during any activity or task. While flow is an enjoyable state that can restore regulatory resources, reaching it requires initial regulatory resource investment (Csikszentmihalyi et al., 2005). For example, to experience flow, employees must self-regulate to overcome initial motivational barriers when beginning with a challenging work task, and, because flow does not occur instantly, employees must resist distractions and interruptions when persisting with that task to eventually reach this peak state of motivation. Doing so, however, becomes increasingly difficult when employees are in a resource protection mode associated with states of ego depletion. The absence of flow, in turn, makes employees feel less physically, cognitively, and emotionally connected with their work and prevents "successful recovery from (…) energy-draining experiences" (Demerouti et al., 2012, p. 278). In summary, an aversive morning commute triggers a daily regulatory resource loss process that prevents the benefits of the resource-restoring function of flow experiences (Demerouti et al., 2012; Sonnentag et al., 2012). This argument aligns with the COR theory's proposition that resource depletion makes individuals more vulnerable to resource loss and less capable of resource gain (Hobfoll et al., 2018).

Expanding our argument toward employee effectiveness, we propose that employees show less work engagement—a core indicator of employee effectiveness (Schneider et al., 2018)—on days when they experienced flow less frequently due to an aversive morning commute. Work

engagement constitutes a pervasive motivational state that captures the degree to which employees apply their cognitive, physical, and emotional energies to their jobs (Newton et al., 2020). In contrast to flow, which represents an acute state of immersion in a particular task or activity that can but does not need to be work-related, work engagement is not focused on any specific task, objective, or activity but instead describes a general connection with one's work on multiple levels (Demerouti et al., 2012). More specifically, work engagement encompasses a physical-energetic component during work (vigor), an emotional component of being proud of the work one is doing (dedication), and a cognitive component of feeling engrossed when working hard (absorption). A core difference between work engagement and flow is that flow is a task-specific motivational state consisting of being focused on a present activity, the merging of action and awareness, the feeling that the activity is guided by an inner logic, and a change in one's experience of time (Csikszentmihalyi, 1975). Supporting the conceptual uniqueness of the task-specific nature of flow and the general nature of work engagement, both constructs exhibit differential relationships with work outcomes (Van Ittersum, 2015).

The theoretical rationale for the positive link between flow and work engagement is based on the resource recovery function of flow. During states of flow, employees perceive their tasks or activities as interesting and enjoyable, which develops and broadens motivational resources toward their job (Demerouti et al., 2012). That is, flow experiences make individuals feel more positive about their jobs and can foster energy for broader work tasks beyond the activity at hand. In line with this notion, two diary studies (Demerouti et al., 2012; Xanthopoulou et al., 2018) have shown that flow is related to day-specific recovery and vigor as well as a lower level of end-of-workday exhaustion and a reduced need for recovery. To summarize, we pose the following hypothesis:

Hypothesis 1: The negative day-specific relation between an aversive morning commute and work engagement is mediated by flow experiences.

The Moderating Role of Daily Impulse Control Demands

Impulse control demands, which encompass dealing with an unfriendly customer or talking politely to an unpleasant colleague reflect a prevalent daily demand for most employees. Coping with this demand requires employees' self-regulation, which depletes their regulatory resources (Diestel & Schmidt, 2011; Rivkin et al., 2015; Schmidt & Neubach, 2007). Field (Diestel & Schmidt, 2011; van Woerkom et al., 2016) and experimental studies (Dang, 2018) have demonstrated that coping with multiple self-control demands jointly overtaxes employees' regulatory resources leading higher level of depletion than predicted by their additive effects.

The notion that multiple activities that require self-regulation might reinforce each other and exert overadditive effects can be explained based on COR theory (Hobfoll & Shirom, 2001), which suggests that resource loss stemming from depleting activities reduces available resources for subsequent activities and makes employees more vulnerable when they are forced to expend additional resources to cope with upcoming demands (van Woerkom et al., 2016). This increased vulnerability emerges because depleted employees must not only self-regulate to cope with the additional upcoming demands but also overcome motivational tendencies to conserve regulatory resources. In other words, they are in a resource protection mode (Chong et al., 2020) that sensitizes them toward further resource demands, but they cannot follow their natural tendency to withdraw from these demands to replenish their regulatory resources. Instead, employees who face high impulse control demands at work are prompted by their work situation to invest regulatory resources to handle such demands. As such, employees who are depleted face the risk of a loss spiral, which COR theory describes by stating that people with fewer resources are more likely to experience further loss of resources (Hobfoll et al., 2018).

Transferred to the context of an aversive morning commute, the previous line of argumentation implies that an employee who arrives at work in an already depleted state (Zhou et

al., 2017) becomes more defensive toward investing further resources (Halbesleben et al., 2014; Hobfoll & Shirom, 2001). When this employee is confronted with high daily work-related impulse control demands, investing regulatory resources becomes disproportionally more difficult because, in addition to the depleting effect of the demand itself, the employee must overcome the urge to conserve their resources. That is, the employee's state of depletion puts them into a heightened resource protection mode that, according to COR theory emerges when individuals have already lost resources (Chong et al., 2020; Muraven et al., 2006). In turn, the employee must invest comparatively more regulatory resources to handle the demands than when in a non-depleted state. Because experiencing flow necessitates the initial expenditure of regulatory resources, this translates into a reduced likelihood of experiencing flow, which ultimately manifests in lower work engagement. In combination, this leads to the following hypothesis:

Hypothesis 2: Day-specific impulse control demands moderate the indirect negative day-specific relation between an aversive morning commutes and work engagement via flow experiences such that the relationship becomes stronger when impulse control demands are high.

Basic Needs Satisfaction as a Protective Factor against the Joint Effects of an Aversive Commute and Self-Control Demands

Thus far, we focused on the regulatory resource loss process initiated by an aversive morning commute and exacerbated by self-control demands. As both stressors cannot always be avoided, the question of how employee effectiveness can be protected from the adverse interplay of both stressors arises. To answer this question, we propose motivational contingencies as potential moderators that can interrupt the regulatory resource loss process. More specifically, previous research has suggested that the intrinsic motivation associated with activities that are congruent with deeply held values or one's "true self" facilitates employees' optimal functioning

(Abuhamdeh, 2012; Ryan & Deci, 2001). According to self-determination theory (Ryan & Deci, 2000), the satisfaction of three basic psychological needs represents a core contingency, which enhances intrinsic motivation: The need for autonomy (i.e., an individual's desire to act according to integrated norms and values and thus to be the origin or source of one's behavior), the need for competence (i.e., a capacity to interact effectively in a specific environment and to experience opportunities to enhance and express these capabilities), and the need for relatedness (i.e., a feeling of staying connected with and being cared for by significant other).

Drawing on COR theory's proposition that people with greater resources are less vulnerable to resource loss and better positioned for resource gain (Halbesleben et al., 2014; Hobfoll & Shirom, 2001), we argue that a work environment that satisfies employees' basic psychological needs facilitates intrinsic (in contrast to extrinsic) motivation, which helps maintain and enhance regulatory resources (Ryan & Deci, 2008). Thus, an employee whose needs are satisfied can draw on an expanded pool of regulatory resources, which enhances their willingness to invest said resources at work and reduces the tendency to protect their remaining regulatory resources when they are depleted through an aversive morning commute. The reduced susceptibility to conserving regulatory resources is particularly helpful in alleviating the overadditive resource drain caused by coping with self-control demands in a depleted state because it helps employees to overcome motivational tendencies to protect remaining resources, which makes coping with self-control demands less depleting. Accordingly, employees with high needs satisfaction still possess sufficient regulatory resources to experience flow even when confronted with both an aversive morning commute and additional impulse control demands.

In line with theoretical and empirical calls to examine the distinct effects of each need (van Den Broeck et al., 2010), we next outline the unique contribution of each need to enhance employees' regulatory resource pools and reduce the tendency to conserve regulatory resources.

First, employees with high autonomy need satisfaction engage in work out of a sense of autonomous choice and volition. This can—but does not necessarily—overlap with employees' job autonomy (Cooman et al., 2013). If employees feel that their autonomy need is satisfied, they experience harmonious and efficient behavioral regulation (i.e., intrinsic motivation) that expands their regulatory resource pools (Ryan & Deci, 2008), which in turn helps them to avoid entering a resource preservation mode associated with ego depletion. In contrast, employees with low autonomy need satisfaction are more likely to engage in work out of a sense of external pressure and to perceive that they cannot determine when and how to tackle work demands. This lack of autonomy need fulfillment thus entails that they are in an alerted state of monitoring their remaining resources, which means they need to invest much more of their remaining resources to experience flow than their autonomously motivated counterparts.

Second, high competence need satisfaction counteracts the tendency to conserve regulatory resources in the face of overadditive resource demands by facilitating automatic (as opposed to controlled) cognitive processing when engaging in work-related activities (Baumeister et al., 2000). Experimental (Fairclough et al., 2005) and applied (Ohly et al., 2017) research supports this notion by demonstrating that being competent in a certain area facilitates automated processing. As it is efficient and requires barely any self-regulation (Kaplan & Berman, 2010), automatic processing helps to maintain and preserve regulatory resources for challenging work tasks. To illustrate, when attempting to resolve a customer's problem, an experienced employee can draw on solutions that were effective in the past, leaving them with more regulatory resources to fully focus on the interaction with the customer. In summary, employees whose competence need satisfaction is high can rely on automatic processing for many work tasks, which helps them to mobilize regulatory resources when confronted with demands and reduces the tendency to enter a resource protection mode.

Third, relatedness need satisfaction helps to enhance employees' regulatory resources, particularly through positive experiences when working with others. High relatedness need satisfaction entails that employees regularly experience positive social interactions at work, which support human flourishing (Ryan & Deci, 2001). Specifically, social support at work due to high relatedness need satisfaction may enhance employees' regulatory resources and help them to overcome the urge to conserve self-regulatory resources in the face of overadditive demands. For one, employees who experience high relatedness need satisfaction benefit from the social drive of those around them (Owens et al., 2016). That is, being able to relate to others at work is associated with a motivational momentum, which makes it more likely to experience states of flow when confronted with overadditive depletion of regulatory resources. To summarize, we examine the moderating effects of autonomy, competence, and relatedness need satisfaction on the impact of aversive commutes and impulse control demands on flow experiences and formulate the following hypothesis:

Hypothesis 3: Employees' satisfaction of their general work-related needs for (a) autonomy, (b) competence, and (c) relatedness moderates the proposed moderated mediation model such that the moderating effect of day-specific impulse control demands on the day-specific indirect effect of an aversive morning commute on work engagement via flow experiences becomes weaker when the satisfaction of employees' work-related needs for (a) autonomy, (b) competence, and (c) relatedness is high.

Study 1

Method

Participants and Procedure

We conducted a daily diary study to test the proposed model. The data were collected in Germany via the organizational contacts of the researchers and student assistants. The research

protocol was developed in line with the APA Ethical Principles as the organizational policies at the authors' institutions at the time of data collection for Study 1 did not require ethical approval for noninvasive, survey-based research. We emailed potential participants explaining the procedure of the study and asking them to complete an informed consent form. After employees gave their consent, they received a pre-survey to measure demographics, general characteristics of their work commute as well as basic needs satisfaction. At the end of this pre-survey, participants chose 10 workdays (Monday-Friday) during the following month, on which they commuted to work and wished to receive the day-specific surveys. These days could, but did not have to, be consecutive. Night and shift workers were excluded from our data collection. For each selected day, participants indicated their estimated times at which they planned to start and finish work as well as to arrive at home after work. Subsequently, participants received three surveys a day in alignment with their indicated times. We administered the morning survey one hour after the start of work, the afternoon survey one hour before the end of work, and the evening survey one hour after arriving at home. If participants did not complete a survey within an hour after the reception, we sent a reminder. Participants had three hours to respond until the specific survey was deactivated.

In total, 60 out of 78 contacted employees completed the pre-survey. We had to exclude seven participants because they did not respond to any daily surveys. This resulted in a final sample of $N = 53$ (overall response rate of 68%). On the day-level, the 53 participants provided data for 411 days out of potential 530 days (53 participants x 10 days), resulting in a response rate of 78%. Taking the demanding nature of the study and the fact that participants received no compensation into account, our response rates of 68% on the person-level and 78% on the day-level are satisfactory (e.g., Dumas & Perry-Smith, 2018; Menges et al., 2017). Moreover, we

examined differences in demographic characteristics between participants who completed the initial survey and the daily surveys ($N = 53$) and those who only completed the initial survey ($N = 7$) through t-tests. Our results indicate no significant differences in relevant demographic characteristics between these groups (age: $t = 0.44$, df = 5.67, $p = .67$; gender: $t = -0.45$, df = 6.11, $p = .67$; distance to work: $t = -1.17$, df = 8.91, $p = .27$; commute by car: $t = 0.20$, df = 6.06, $p = .85$; commute by public transport: $t = -0.44$, df = 6.35, $p = .67$; commute by walking or cycling: $t = 0.20$, df = 5.82, $p = .85$).

Participants worked in various sectors (17% health, 11% banking and insurance, 11% IT and communication, 9% education and teaching, 9% craftsmen, 6% retail, 6% public service, 6% manufacturing, and 25% in other sectors). Their age ranged from 19 to 62 years ($M = 38.00$; $SD = 13.51$). The rate of female participants was 57%. Participants' distance to work ranged from 1 to 140 km ($M = 19.40$ km; $SD = 21.86$ km). Most participants commuted by car (62%), followed by public transport (25%), and cycling and walking (13%). The average time for the commute to work was 32.74 min ($SD = 23.88$ min.).

Measures and Control Variables

Basic Needs Satisfaction. We measured work-related autonomy, competence, and relatedness needs satisfaction in the pre-survey with a 12-item scale from Chiniara and Bentein (2016), who introduced a shortened version of the original basic needs satisfaction scale developed by Van den Broeck et al. (2010). A research assistant translated the English original items to German. Then the second author back-translated them to English and compared them with the original items. If the translated version was different from the original, we searched for a more appropriate German translation using an online dictionary and then asked a third research assistant to translate the adapted German item to English again. This step ensured that we did not

have any discrepancies between the meaning of the German and English items. Each need was measured with four items (e.g., autonomy: "How satisfied are you with the opportunities to take personal initiatives in your work?", $\alpha = .92$; competence: "How satisfied are you with the feeling of being competent at doing your job?", $\alpha = .87$, relatedness: "How satisfied are you with the positive social interactions you have at work with other people?", $\alpha = .88$). All items were rated on a 5-point response scale (1 = *very dissatisfied*; 5 = *very satisfied*).

Aversive Morning Commute. We assessed aversive morning commute in the morning with six items from the subscale developed by Novaco et al. (1990). Participants rated how they experienced commuting to work. An exemplary item is: "Today, my commute to work was …" "crowded (e.g., heavy traffic, crowded buses) — empty". We used the same translation-back-translation procedure as outlined above. All items were rated on a 5-point Likert scale with semantic differentials (e.g., 1 = *uninterrupted*; 5 = *stop and go*; α-range across days = 84 – .95).

Flow Experiences. We assessed day-specific flow experiences in the afternoon with seven items from the German Flow Short Scale (Engeser & Rheinberg, 2008; Rheinberg et al., 2003). Due to high cross-loadings on work engagement in our multilevel confirmatory factor analyses (MCFAs), we removed three items from the original 10-item scale. Participants rated their flow experiences throughout the day on a 7-point rating scale (1 = *not at all*; 7 = *a great deal*; α-range across days = .81 – .93). An example is "Today, my thoughts/activities ran fluidly and smoothly."

Impulse Control Demands. We measured day-specific impulse control demands in the afternoon with six items from the German self-control demands scale (Schmidt & Neubach, 2007). Participants rated the degree to which they had to control day-specific impulses during work on a 5-point Likert rating scale (1 = *not at all*; 5 = *a great deal*; α-range across days = .83 – .93). An example item is "In the last hours, my job required me not to lose my temper".

Work Engagement. We assessed day-specific work engagement in the evening after work with the German 9-item version (Sonnentag, 2003) of the Utrecht Work Engagement Scale (Schaufeli et al., 2006; α-range across days = .96 – .97), which was adapted for day-specific assessment and involves three facets: vigor (e.g., "Today, I felt strong and vigorous at my work."), dedication (e.g., "Today, I was enthusiastic about my job."), and absorption (e.g., "Today, I felt happy when I was working intensely.). The response format ranges from 1 = *strongly disagree* to 6 = *strongly agree*. As suggested by Xanthopoulou et al. (2009), we incorporated the three facets of work engagement into a general work engagement factor.

Control Variables. We controlled for commute time because it may influence the likelihood of aversive commute experiences and has been linked to decreased work motivation (VitalityHealth, 2017). Commute time was measured with one item each day in the morning (i.e., "How many minutes did it take you to commute to work today?").

Construct Validity

We conducted MCFAs to assess the psychometrical distinctness of our variables. In line with suggestions by Dyer et al. (2005), we specified the day-level variables in our model at the within- and the satisfaction of each basic need at the between person-level. To evaluate the goodness of fit of our models, we used cut-off values as recommended by Hu and Bentler (1999; root mean square error of approximation [RMSEA] =.06; comparative fit index [CFI] = .95; standardized root mean square residual within and between [SRMRw/b] = .08). However, because these cut-off points were derived from simulated data that do not take nested data structures into account, a deviation from these cut-off values should not unequivocally lead to rejecting the proposed theoretical model (Williams et al., 2020). The results of MCFAs examining different models are presented in Table 1. In line with our theoretical propositions a

model, which distinguishes between all variables on the between (3-Factors: autonomy, competence, and relatedness need satisfaction) and the within-person level (4-Factors: Aversive morning commute, flow experience, impulse control demands, and work engagement) yielded a satisfactory fit: $\chi^2(395) = 1053.97$, $p < .01$, RMSEA= .064, CFI = .914, SRMRw/b) = .059/.096) and performed better than any other model in which we combined different variables into a single factor.

Analytical Procedure

We published the data for Study 1 and the Mplus codes for the analysis presented in the results section on the Open Science Framework (doi:10.17605/OSF.IO/DMVTQ). Because day-level data were nested within person-level data, our hypotheses were tested through Multilevel Structure Equation Modelling (MSEM; see Preacher et al., 2010) in Mplus 8.2 (Muthén & Muthén, 1998-2012). This method allows for analyses on multiple levels and is less prone to bias than more traditional approaches to multilevel mediation analysis (e.g., Multilevel Modelling; for further information see Preacher et al., 2010). We examined our hypotheses by specifying a 1-1-1 moderated mediation model with random slopes (Preacher et al., 2010) and maximum likelihood estimation with robust standard errors.

On the within-person level, we specified three random slopes, which vary across Level-2 units, for the relationships between aversive morning commute (X), impulse control demands (W), and the interaction of aversive morning commute and impulse control demands (X*W) on the one hand and flow experiences (M) on the other hand. Subsequently, work engagement (Y) was predicted by aversive morning commute (X) and flow experiences (M). On the between-person level, we specified satisfaction of each basic need (Z1, Z2, Z3) to predict both endogenous variables (i.e., flow experiences and work engagement). Moreover, each need was

specified to predict all three random slopes. The direct effects of each cross-level moderator on all random slopes correspond with two-way interactions of the main predictor and these variables (X*Z and W*Z) in traditional moderation analyses (Dawson & Richter, 2006). The relation of the satisfaction of each need with the random slope linking the interaction between aversive morning commute and impulse control demands to flow experiences represents three-way interaction for each need (X*W*Z).

Following Hofmann and Gavin (1998) and Ohly et al. (2010), we person-mean centered all exogenous Level-1 variables to statistically control for potential between-person differences related to these constructs (i.e., distance to work) by removing these from the data. Because we use MSEM and specify flow and work engagement on both levels the variance of these variables is decomposed into a within- and between-person part, which on the within-person level is equivalent to person-mean centering (Preacher et al., 2010) but does not change the between-level intercept of these variables to zero. Finally, as on the between-person level basic needs satisfaction are highly correlated (see Table 2), we applied residual centering to orthogonalize the items to measure the satisfaction of each need from the other two (Geldhof et al., 2013). This procedure removes the collinearity between the satisfaction of one need to the other two needs from the model (Geldhof et al., 2013), which also allows us to examine the unique moderating role of each need. To avoid reintroducing multicollinearity between needs by simultaneously examining orthogonalized variables (i.e., double orthogonalization; Geldhof et al., 2013), we specified multiple models to test the proposed three-way interactions. Following the procedure outlined by Geldhof et al., (2013) we applied residual centering at the item level. In Model 1, we centered autonomy need satisfaction by regressing all items of competence and relatedness need satisfaction on each of the items measuring autonomy need satisfaction. In Models 2 and 3 we applied the same procedure to competence and relatedness need satisfaction. In all three models,

we also added the raw scores of those needs, which were not-residually centered. To facilitate the interpretation of coefficients we grand mean centered all three needs (Enders & Tofighi, 2007).

Because the conventional bootstrapping method of re-sampling cannot be applied in multilevel modeling (Preacher & Selig, 2012; Van der Leeden et al., 2008), we utilized a Monte Carlo approach of re-sampling to estimate confidence intervals for the indirect effects to test the proposed mediation hypotheses (Preacher & Selig, 2012). Specifically, we computed bias-corrected 95% confidence intervals (CI) based on 20,000 re-samples using the software provided by Preacher and Selig (2012). For testing the moderated mediation effects, we extended the above procedure to test conditional indirect effects where the magnitude of the first-stage coefficient was calculated at a lower (– 1 *SD*) and higher (+1 *SD*) levels of impulse control demands and basic needs satisfaction (Koopman et al., 2016; Lanaj et al., 2014). The presence of an indirect effect is rejected if a corresponding confidence interval does include zero (Preacher et al., 2007).

Results

Table 2 displays descriptive statistics, internal consistencies, and correlations among all Study 1 variables. Before testing our hypotheses, we examined the focal variables' within- and between-person variation. For aversive morning commute, impulse control demands, flow experience, and work engagement the proportions of within-person variance were 69.1%, 37.2%, 42.1%, and 23.2%, respectively, justifying the application of multilevel modeling.

Table 3 shows the results of our multilevel structure equation models. Where the results between the three tested models correspond with the results of Model 1, we will exemplary present the results of Model 1. With regard to direct effects, our data show a negative relation between day-specific aversive morning commute and flow experiences ($\gamma = -.15$, $p < .01$), and a positive relation between flow experiences and work engagement ($\gamma = .48$, $p < .01$). Hypothesis 1 suggests an indirect effect of an aversive morning commute on work engagement through

reduced flow experiences. Our data supports this hypothesis as the 95% CI for the indirect effect did not include zero (γ = -.07, p < .01; 95% CI [-.129, -.025]).

Hypothesis 2 proposes that impulse control demands moderate the indirect effect of an aversive morning commute on work engagement through flow experiences. In support of this hypothesis, the random slope of aversive morning commute (AC)×impulse control (IC) demands interaction, and flow experiences was significant (γ = -.23, p = .02). To explore this within-person interaction, we plotted the relationship at conditional values of impulse control demands (+/–1 *SD*; Cohen et al., 2003). Figure 2 demonstrates that only on days when impulse control demands are higher than a person's average there is a significant negative relation between aversive morning commute and flow experiences at work. To examine the proposed moderated mediation hypothesis, we again computed the conditional indirect effects for low and high levels of day-specific impulse control demands. In line with Hypothesis 2, the 95% CI of the indirect effect from aversive morning commute on work engagement through flow experiences on days with high levels of impulse control demands did not include zero (γ = -.15, p < .01; 95% CI [-.239, -.061]). Whereas this indirect effect was not significant on days with low levels of impulse control demands (γ = .00, p = .95; 95% CI [-.077, .068]). The difference between these conditional indirect effects was also significant (γ = -.14, p = .02; 95% CI [-.271, -.021]).

Hypotheses 3a-c suggest basic needs satisfaction for autonomy, competence, and relatedness as cross-level moderators of the AC×IC interaction. Accordingly, we argue that the moderated mediation via flow experiences is weaker for individuals with high (a) autonomy, (b) competence, and (c) relatedness needs satisfaction. Our results do not support the proposed moderating effects for the unique effect of each need as the three-way interactions for each residually centered need did not become significant (Model 1 - AC× IC×autonomy need

satisfaction (NSA): γ = .00, *p* = .99; Model 2 - AC×IC× competence need satisfaction (NSC): γ = .20, *p* = .38; Model 3 - AC×IC×relatedness need satisfaction (NSR): γ = -.03, *p* = .78;). Yet, in Models 1 and 2 where we applied residual centering to autonomy and competence need satisfaction, the three-way interaction for the raw scores (non-residual centered) of autonomy and competence needs satisfaction became significant (Model 1 - AC×IC×NSC: γ = .25, *p* = .02; Model 2: AC×IC×NSCA: γ = .17, *p* = .03). Residual centering did not affect the results for relatedness need satisfaction. Thus, our data did not support the proposed three-way interaction effect for relatedness need satisfaction. In sum, comparing the results of the first two- (cf. Model 1 and 2) to the last model (cf. Model 3) indicates that the three-way interactions for autonomy or competence need satisfaction become significant once the collinearity between these needs is removed from the data through residually centering to one of the needs. Moreover, the fact that three-way interactions is significant for the non-residually centered autonomy (cf. Model 2) and competence (cf. Model 1) needs satisfaction strongly suggests that the shared variance between person-level autonomy and competence needs satisfaction is responsible for the three-way interaction effect. We draw this conclusion because the shared variance is still present in each non-centered need whereas it is removed from the residually centered need.

We further examined whether the patterns of these three-way interaction effects of the non-residually centered needs correspond with our predictions by plotting the interactions and conducting simple slope tests (Dawson & Richter, 2006; see Figure 3). Pairwise slope difference tests to compare the slopes for high (+1*SD*) and low (-1*SD*) levels of person-level basic needs satisfaction and day-level impulse control demands suggest that for individuals with higher competence (Model 1: Slope difference = -0.05, t = -0.32, p = .75) or autonomy (Model 2: Slope difference = -0.11, *t* = -0.71, *p* = .48) need satisfaction there was no significant difference in slopes

for days with higher compared to lower day-specific impulse control demands. In contrast, for employees who experience lower competence- (Model 1: Slope difference = -0.54, t = -2.96, p < .01) or autonomy (Model 2: Slope difference = -0.54, t = -3.38, p < .01) need satisfaction, there was a significant difference between slopes for days with high compared to low impulse control demands.

We also examined the conditional indirect effects for all four combinations of needs satisfaction (higher vs. lower) and impulse control demands (higher vs. lower). The results show that for individuals with higher competence- or autonomy need satisfaction on days with both higher and lower impulse control demands there was no indirect effect of an aversive morning commute on work engagement through flow experiences (cf. Table 3). Accordingly, the difference between conditional indirect effects for higher as compared to lower daily levels of impulse control demands was not significant for individuals with higher competence- (Model 1: γ = -.02, p = .74; 95% CI [-.167, .109]) or autonomy (Model 2: γ = -.05, p = .49; 95% CI [-.205, .095]) need satisfaction.

For individuals with lower levels of competence or autonomy needs satisfaction, there was also no significant indirect effect of an aversive morning on work engagement on days with lower levels of impulse control demands (cf. Table 3), whereas on days with higher impulse control demands there was a significant adverse indirect effect of an aversive morning commute on work engagement via flow experiences (cf. Table 3). The difference between the previously mentioned conditional indirect effects became significant for individuals with lower competence (Model 1: γ = -.26 p < .01; 95% CI [-.432, -.093]) or lower autonomy need satisfaction (Model 2: γ = -.26, p < .01; 95% CI [-.403, -.116]).

Finally, we calculated the amounts of variance in our endogenous variables explained by our predictors. As traditional R^2 values are not available for MSEM, we followed

recommendations by Snijders and Bosker (2012); for discussion of the validity of this approach see also LaHuis et al., 2014). The predictors explained 40.2% of the total variance for flow experiences and 38.5% for work engagement at the within-person level. These proportions of explained variance do not only support the theoretical, but also practical relevance of our model.

Additional Analyses

To test the robustness of our findings, we examined the relevance of previous day endogenous variables for our results. On the within-person level for each endogenous variable (flow experiences and work engagement), we specified the same variable measured on the previous day as a predictor. As our diary study involved ten workdays, we also controlled for cyclical effects, as the repeated presentation of survey measures across time may affect participants' responses (Beal & Ghandour, 2011; Gabriel et al., 2019). Accordingly, we added day, sine of day, and cosine of day to predict both endogenous variables. The results demonstrate that the matching previous day predictors (t-1 - flow experiences and work engagement) were significantly related to each outcome (t - flow experiences and work engagement), whereas there were no significant cyclical effects. Notably, the inclusion of both previous-day predictors and cyclical effects did not affect the main findings of our study.

In line with current recommendations to expand the interpretability of significance values, we also conducted post-hoc power analyses. The results of these analyses reflect the probability of replicating our findings (Bliese & Wang, 2020). These analyses indicate that for the main and indirect effects of an aversive morning commute on work engagement via flow experiences observed power was in line with recommendations of at least 80% (all t's > 2.81; Bliese & Wang, 2020). However, the observed power for the two-way interaction of aversive morning commute and impulse control demands was 62.9%, while the observed power values

for the three-way interactions involving autonomy and competence needs satisfaction analyses were 59.1% and 68.5%, respectively. These probabilities indicate a higher likelihood of detecting the proposed direct and indirect effects in a follow-up study with the same sample size compared to the proposed two- and three-way interaction effects.

Discussion Study 1

The results of Study 1 support a daily adverse chain of effects linking aversive morning commutes to work engagement through flow experiences. This indirect relation was exacerbated on days with high impulse control demands. Furthermore, we found support for the proposed cross-level three-way interactions for autonomy and competence needs satisfaction, such that for individuals with higher autonomy and competence needs satisfaction, flow experiences were less impaired by the regulatory resource loss process initiated by an aversive morning commute and exacerbated by self-control demands.

Despite its contributions, Study 1 is subject to at least four limitations, which we addressed in a second study. First, in line with previous research on the depleting effects of pre-work experiences (Lanaj et al., 2014; Zhou et al., 2017), our theoretical argument suggests ego depletion as an additional mediator in our model. More specifically, we argue that an aversive morning commute depletes regulatory resources, which makes it more difficult for employees to experience flow. Our moderated mediation model and, in particular, the two-way interaction with impulse control demands support this proposition. Nevertheless, in Study 1, we do not explicitly examine regulatory resource depletion as a mediator. Despite the strong theoretical rationale for regulatory resource depletion as the core mechanism underlying the adverse effects of aversive morning commutes, alternative mechanisms could also be responsible for the detrimental impact of aversive commutes. For example, the transactional model of driver stress suggests that aversive commute experiences induce negative affective states and tension, which in turn impair

work-related outcomes (Matthews, 2002). To further disentangle the proposed mechanisms linking aversive morning commutes to employee effectiveness, in Study 2, we tested ego depletion after the commute as an additional mediator of the proposed relations while controlling for negative affect and tension as potential alternative mechanisms.

Second, we separated the measurement times of our mediator flow experiences and our outcome work engagement in Study 1, but both variables still referred to the entire workday. As such, we did not explicitly consider that flow experiences precede work engagement. We therefore further disentangled these relations in Study 2 by examining time-lagged relationships between flow experiences and work-related outcomes (see Rivkin et al., 2018).

Third, while we selected work engagement as an outcome that is highly relevant for organizational functioning (Christian et al., 2011; Halbesleben, 2010; Knight et al., 2017), scholars in the resource-based tradition have also expressed interest in behavioral performance outcomes (Call & Ployhart, in press). This call has also been echoed in the emerging literature on the spillover effects of commuting on behavioral indicators of employee effectiveness (Calderwood & Mitropoulos, 2020). To expand our contribution, we also examined in-role and extra-role performance as additional outcomes in Study 2. Because performing well in core and extra-role tasks at work on a given day requires self-regulatory resources (Binnewies et al., 2009) that employees can obtain through flow experiences (Bakker et al., 2011; Kasa & Hassan, 2015), we argue that the adverse spillover effects of aversive morning commutes should also reduce employees' in-role and extra-role performance (see Schaeffer et al., 1988).

To summarize, we addressed the shortcomings of Study 1 by explicitly studying ego depletion as an additional mediator and by expanding the range of outcomes to include behavioral indicators of employee effectiveness.

Hypothesis 4: The negative day-specific relation between employees' perceptions of an aversive morning commute and (a) work engagement, (b) subjective performance, and (c) OCB-I is sequentially mediated by ego depletion and flow experiences.

The fourth limitation of Study 1 concerns the three-way cross-level interactions involving person-level general basic needs satisfaction. Whereas work-related needs satisfaction has most typically been studied as a person-level variable that reflects traits or trait-like terms, a growing body of research has highlighted the pivotal role of daily (within-person) fluctuations in work-related needs satisfaction (De Gieter et al., 2018; Hewett et al., 2017; Reis et al., 2000; van Hooff & Geurts, 2015). However, thus far, it is not clear whether it is reasonable to expect homology between more long-term person- and more short-term day-level satisfaction of basic needs, as person- and day-level relations can differ (Chen et al., 2005; Reis et al., 2000). More specifically, person-level studies focus on the effects of employees' general need fulfillment at work, whereas day-level studies investigate daily fluctuations in need fulfillment as compared to an employees' baseline (Reis et al., 2000).

To address the question of homology, we examined day-level basic needs satisfaction in Study 2 as a protective factor against the joint effects of ego depletion following an aversive morning commute and daily impulse control demands. We investigated the proposed three-way interactions on the relation between ego depletion and flow experience rather than the link between aversive morning commute and ego depletion (see Figure 1) because, in line with previous research (Chong et al., in press; Lanaj et al., 2014; Tong et al., 2019), we do not expect basic needs satisfaction to prevent the depleting effects of stressors that require self-regulation (such as an aversive morning commute); instead, we expect that it will mitigate the impact of resource loss processes on subsequent experiences and behaviors at work. Accordingly, our theoretical argument suggests that high basic needs satisfaction restores employees' regulatory

resource pools thereby interrupting the regulatory resource loss processes initiated by aversive morning commutes and exacerbated by daily impulse control demands.

Besides testing for homologous effects, the focus on day-level needs satisfaction allowed us to further disentangle the unique moderating effects of each need. In line with previous evidence that indicates substantial correlations among autonomy and competence need satisfaction at the between-person level (Van den Broeck et al., 2016), Study 1 suggests that the common variance of autonomy and competence need satisfaction is responsible for the protective function of those needs. However, initial evidence from within-person research on needs satisfaction suggests that day-specific autonomy and competence need satisfaction share less common variance as indicated by the weaker correlations of these needs on the within- as compared to the between-person level (de Gieter et al., 2018; Ilies et al., 2017). This weaker correlation may therefore allow us to examine whether the unique daily satisfaction of each need can protect employee effectiveness from the regulatory resource loss process initiated by an aversive morning commute.

First, on days when an employee's autonomy need satisfaction is particularly high, they may experience a satisfactory degree of freedom to do their work as they prefer and to engage in work tasks at their own pace. These experiences enhance the employee's regulatory resource pools through positive feelings of agency and intrinsic motivation (Csikszentmihalyi, 1975; Engeser & Schiepe-Tiska, 2012). Accordingly, the satisfaction of having autonomous control over their work should reduce the depleting nature of having to cope with self-control demands when in states of ego depletion, leaving employees' with sufficient regulatory resources to fully engage in work tasks, which increases the likelihood to experience flow at work on that day.

Second, on days with particularly high competence need fulfillment, employees experience a higher degree of less effortful automatic cognitive processing as opposed to more effortful

controlled processing while working (Kaplan & Berman, 2010), which helps maintain their pool of regulatory resources and reduce tendencies to conserve said resources. As such, regulatory resource-draining experiences (e.g., an aversive morning commute and impulse control demands) should not prevent an employee who experiences high daily competence need satisfaction from engaging in challenging work tasks. Accordingly, employees may still experience peak episodes of flow in the face of high demands on a day at which their need for competence is satisfied.

Third, on days with particularly high relatedness need satisfaction, employees experience many fulfilling social encounters at work. We expect that the perceived social connectedness and support on that day replenishes an employees' regulatory resource pool (Ryan & Deci, 2001), thus preventing them from entering a resource protection mode, which in turn helps protect their flow experiences from having to cope with impulse control demands in a depleted state. In contrast, on days when an already depleted employee does not feel supported by and connected with others at work, dealing with additional demands can quickly put people in a narrow-minded cognitive state of maladaptive affect-focused rumination (Gabriel et al., 2020) and self-awareness (see Leary, 2005).

In sum, our theoretical arguments and empirical evidence support the proposed homology regarding the role of person- and day-level basic needs satisfaction in our research model.

Hypothesis 5: Employees' impulse control demands and satisfaction of their day-specific work-related needs for (a) autonomy, (b) competence, and (c) relatedness moderate the proposed moderated mediation model, such that the moderating effect of day-specific impulse control demands on the day-specific indirect effect of an aversive morning commute on work engagement, subjective performance, and OCB-I via ego depletion and flow experiences becomes weaker when the satisfaction of employees' day-specific needs for (a) autonomy, (b) competence, and (c) relatedness is high.

Study 2

Method

Participants and Procedure

The data collection was conducted as part of a larger study via Prolific Academic in the UK, an online provider that offers access to participants and guarantees high-quality data (Palan & Schitter, 2018; Peer et al., 2017). Walter et al. (2019) have shown that data collected via online providers possess similar psychometric properties and produce criterion validity that generally falls within the credibility intervals of existing meta-analytic results from conventionally sourced data. Previous research has demonstrated that compared to participants recruited via other platforms (e.g., Mechanical Turk, Crowd Flower), participants recruited via Prolific Academic are more diverse and produce higher-quality data (Palan & Schitter, 2018; Peer et al., 2017).

The research protocol for Study 2 was approved by the Norwich Business School's Research Ethics Committee. First, we selected participants for Study 2 by conducting an eligibility check. Eligible participants had to be at least 18 years old, work full-time in the UK (no shift work), and commute to work at least four workdays between Monday and Friday during the time of the data collection. We screened $N = 211$ participants, of whom $N = 108$ participants were eligible. These 108 employees received a pre-survey (as in Study 1) with an informed consent form. This pre-survey was completed by $N = 98$ participants. In this pre-survey, we asked participants to estimate the times at which they started work and arrived at home on each workday in the two weeks starting on the following Monday. Depending on the indicated times, each participant received three surveys a day. The morning survey was administered one hour after the start of work, the noon survey four hours after the start of work, and the evening survey one hour after arriving at home. As in Study 1, participants received a reminder if they did not

complete a survey within an hour after receipt. After receiving each survey, participants were given 2.5 hours to respond; thereafter, the specific survey was automatically deactivated. Participants received compensation of £0.50 for each completed survey. In line with Gabriel and colleagues' (2019) recommendations to increase the response rate, we offered a conditional monetary incentive of £10.00 if participants completed all surveys on seven out of ten days.

We excluded seven participants (from the initial $N = 98$ responses) who did not complete any daily surveys. In total, $N = 91$ employees (84% response rate on the person-level) completed surveys in a period of 10 days, resulting in 719 day-level data points (7.90 days per employee; 79% response rate on the day-level). While the response rate on the person-level was higher than in Study 1, the day-level response rate was comparable. We also examined differences in relevant demographic characteristics between participants who completed the initial survey and the daily surveys ($N = 91$) and those who did not complete the daily surveys ($N = 7$). Our results suggest that respondents' were older than non-respondents ($t = 3.96$, df = 13.52, $p < .01$) and were more likely to commute by public transport ($t = 5.04$, df = 90.00, $p < .01$); otherwise there were no significant differences in demographic characteristics between both groups (distance to work: $t = -0.57$, df = 9.12, $p = .58$; gender: $t = 0.23$, df = 6.90, $p = .83$; commute via car: $t = 1.74$, df = 7.67, $p = .12$; commute via walking or cycling: $t = 0.07$, df = 6.88, $p = .94$).

Participants (77 % female) worked in various sectors (17% teaching & education, 10% IT & communication, 9% health, 9% finance & insurance, 8% construction, 7% retail, 7% public administration, 7% science, 26% in other sectors). Their age ranged from 20 to 65 years ($M = 36.70$; $SD = 10.42$) and their distance to work from 0.5 to 61 miles ($M = 9.77$; $SD = 10.91$). Most participants commuted by car (59%), followed by public transport (22%), and cycling and walking (15%). The mean time of the commute to work was 31.91 min ($SD = 21.27$ min).

Measures and Control Variables

We used the same scales as in Study 1 to measure aversive morning commute (morning; α-range across days = .83 – .90), flow experiences (noon; α-range across days = .87 – .93), impulse control demands (noon; α-range across days = .90 – .98), and work engagement (evening; α-range across days = .95 – .96). Moreover, we rephrased the items of the autonomy (noon; α-range across days = .92 – .96), competence (noon; α-range across days = .86 – .96), and relatedness (noon; α-range across days = .89 - .96) need satisfaction scales so that these referred to day-specific basic needs satisfaction.

Ego Depletion. We measured ego depletion in the morning with five items from Ciarocco et al.'s scale (2010). Participants rated the statements in regard to how they feel right now on a 5-point rating scale (1 = *strongly disagree*; 5 = *strongly agree*; α-range across days = .94 – .96). An example is "Right now, I feel like my willpower is gone".

Subjective Performance. We measured day-specific subjective performance in the evening with two items (Williams & Anderson, 1991). Participants assessed their level of engagement in their core job activities on a 7-point Likert rating scale (1 = *not at all*; 7 = *a great deal*; α-range across days = .86 – .96). An example is "Today, I performed tasks that were expected of me."

OCB-I. Day-specific OCB-I was assessed in the evening with four items (Williams & Anderson, 1991). Participants rated day-specific OCB-I on a 6-point intensity-rating scale (1 = *not at all*; 6 = *a great deal*; α-range across days = .92 – .96). An example is "Today, I helped others at work."

Control Variables. To demonstrate that ego depletion constitutes a dominant mechanism that underlies the adverse effects of aversive morning commutes and to rule out alternative

explanations, we controlled for negative affect and tension in our analyses. Both constructs were rated on 5-Point Likert scales (1 = *Very slightly/not at all*; 5 = *Extremely*) and assessed in the morning. Negative affect was measured with six items (see Sonnentag et al., 2008) that were based on the Positive and Negative Affect Schedule (Watson et al., 1988; α-range across days = .84 – .95). An exemplary item is "Right now, I feel upset". Tension was measured with six items from the Profile Mood States (Shacham, 1983; α = .82 – .96). An exemplary item is "Right now, I feel tense". As in Study 1, we also controlled for commute time.

Construct Validity

As in Study 1, we assessed the psychometrical distinctness of our day-level measures with MCFAs. Since Study 2 exclusively focused on within-person relations, we specified all variables on the within-person level (Dyer et al., 2005). As theoretically proposed, a 12-Factor model on the within-person level in which each of our variables is represented as a distinct factor yielded an acceptable fit (χ^2 (1824) = 4430.41, $p < .01$, RMSEA = .045, CFI = .904, SRMRw = .046; cf., Table 1). This model exhibited a better data fit than any alternative model in which we specified different variables as a single factor (cf., Table 1).

Analytical Procedure

We provide the data for Study 2 and Mplus codes on the website of the Open Science Framework (doi:10.17605/OSF.IO/DMVTQ). We extended the specified MSEM in Study 1 to examine the proposed hypotheses. First, aversive morning commute predicted ego depletion as the first-stage mediator in our model. Moreover, flow experiences—the second-stage mediator—was predicted by aversive morning commute and the satisfaction of all three needs on the within-person level. The proposed moderating effects of impulse control demands, and daily satisfaction of each basic need were examined by specifying the two-way interactions of 'ego depletion×impulse

control demands, ego depletion×basic needs satisfaction', and 'impulse control×basic needs satisfaction' as well as the three-way interactions (ego depletion×impulse control demands×basic needs satisfaction) to predict flow experiences. Finally, we specified paths from ego depletion, flow experiences, and aversive morning commute to our outcomes work engagement, subjective performance, and OCB-I.

As in Study 1, we applied residual centering on an item level to orthogonalize each need from the other two needs. Accordingly, we specified three models to prevent double orthogonalization (Geldhof et al., 2013). This means that we applied residual centering to autonomy, competence, and relatedness need satisfaction respectively in Model 1, 2, and 3. In each model, the raw (i.e., non-residually centered) scores of the remaining two needs were added. To account for their potential confounding effects, we added morning commute time, negative affect, and tension as controls to predict all endogenous variables in our model. Following suggestions by Hofmann and Gavin (1998) and Ohly et al. (2010), we applied person-mean centering to all exogenous variables in our model. We used the Monte Carlo approach of re-sampling described in Study 1 to estimate the confidence intervals for the conditional indirect effects (Preacher & Selig, 2012).

Results

The descriptive statistics, internal consistencies, and correlations among all variables of Study 2 are presented in Table 4.

Before testing our hypotheses, we examined the within- and between-person variation in all study variables. The relatively high proportions of within-person variance for aversive morning commute (60.7%), ego depletion (57.2%), flow experiences (42.4%), impulse control demands (38.1%), autonomy (25.5%), competence (27.0%), and relatedness (22.5%) need

satisfaction, work engagement (34.0%), subjective performance (44.1%), and OCB-I (26.9%) justify the application of multilevel analyses.

The MSEM results are presented in Table 5. As in Study 1 for the effects that do not differ between the three models, we will exemplarily present the results of Model 1. In line with our predictions there was a positive relationship between day-specific aversive morning commute and ego depletion ($\gamma = .19$, $p < .01$), and a negative relation between ego depletion and flow experiences ($\gamma = -.28$, $p < .01$) also when controlling for negative affect ($\gamma = .01$, $p = .93$) and tension ($\gamma = -.11$, $p = .24$) as potential alternative mechanisms. Finally, flow experiences were positively related to all three outcomes (work engagement: $\gamma = .30$; subjective performance: $\gamma = .19$; OCB-I: $\gamma = .14$; all p's $< .01$).

Hypothesis 4 suggests an indirect effect of aversive morning commute on work engagement, subjective performance, and OCB-I through increased ego depletion and reduced flow experiences at work. In support of Hypothesis 4 a-c, the 95% CIs for the serial mediation through ego depletion and flow experience on all outcomes at mean levels of impulse control demands as well as autonomy, competence, and relatedness needs satisfaction did not include zero (cf. Table 6).

Hypothesis 5 proposes a moderated mediation in which day-specific impulse control demands and (a) autonomy, (b) competence, and (c) relatedness need satisfaction moderate the indirect effects of aversive morning commute on all three outcomes. Out of the proposed three-way interactions, only the three-way interaction for residual centered competence need satisfaction (i.e., ego depletion×IC×NSC) was significantly related to flow experiences (Model 2: $\gamma = .27$, $p = .02$), thus providing support for Hypothesis 5b but nor for Hypotheses 5a and 5c.

As in Study 1, we plotted the three-way interaction to examine whether its pattern corresponds with Hypothesis 5b and examined simple slopes as well as slope differences

(Dawson & Richter, 2006) at values of 1 *SD* above and below the mean for both moderators (i.e., impulse control demands, and competence need satisfaction). The pattern of the three-way interaction corresponds with our proposition. More specifically, slope difference tests indicate that there is no significant two-way interaction between ego depletion and impulse control demands on days with high competence need satisfaction (Model 2: slope difference between low and high impulse control demands = 0.08, $t = 0.70$, $p = .48$). In contrast, on days with low competence need satisfaction there is a marginally significant two-way interaction between ego depletion and impulse control demands (slope difference between low and high impulse control demands = -0.18, $t = -1.84$, $p = .07$).

Further testing the hypothesized moderated mediation proposed in Hypothesis 5b, we computed 95% CIs for the indirect effects for all combinations of competence need satisfaction (high vs. low) and impulse control demands (high vs. low) on all three outcomes. Our results indicate that for all combinations of competence need satisfaction and impulse control demands there was an indirect effects of aversive morning commute through ego depletion and flow experience on each outcome as indicated by all corresponding 95% CIs including zero (cf. Table 6). In support of Hypothesis 5b pairwise comparisons of the differences in conditional indirect effects indicated that on days with high competence need satisfaction, there were no differences in indirect effects between high and low levels of daily impulse control demands (Model 2: Work engagement: $\gamma = .01$, $p = .46$; 95% CI [-.008, .019]; Model 2: Subjective performance: $\gamma = .00$, $p = .46$; 95% CI [-.005, .014]; Model 2: OCB-I: $\gamma = .00$, $p = .47$; 95% CI [-.004, .009]) whereas on days when competence need satisfaction was low there was a marginally significant ($p < .10$) difference in indirect effects for days with high as compared to low impulse control demands for all outcomes (work engagement: $\gamma = -.01$, $p = .06$; 90% CI [-.022, -.001]; subjective performance: $\gamma = -.01$, $p = .06$; 90% CI [-.015, -.001]; OCB-I: $\gamma = -.01$, $p = .07$; 90% CI [-.012, -.001]).

Finally, the amounts of explained within-person variance for all endogenous variables in our model were 18.4% for ego depletion, 8.9% for flow experiences, and 36.0% for work engagement: 22.2% for subjective performance, and 7.7% for OCB-I. Thus, considering that various influences on work-related effectiveness outcomes exist, our models still account for relevant amounts of variability in endogenous variables.

Additional Analyses

We conducted the same additional analyses as in Study 1 to test the robustness of our findings. First, we examined the impact of previous day dependent variables and specified the same variable measured on the previous day as a predictor for each dependent variable on the within-person level. Moreover, we controlled for cyclical effects by adding day, sine of the day, and cosine of the day to predict all dependent variables. The results of these analyses demonstrate that the respective previous day predictors were only significantly related to our outcomes (work engagement: $\gamma = .24$, $p < .01$; subjective performance: $\gamma = .19$, $p < .01$; OCB-I: $\gamma = .30$, $p < .01$). There was no evidence for cyclical effects regarding participants' responses. Moreover, as in Study 1, the inclusion of previous day predictors and cyclical effects did not affect the main results.

As in Study 1, we report observed power for the proposed effects (Bliese & Wang, 2020). For the direct effects, observed power was above 80% (all t's > 2.81; Bliese & Wang, 2020). For the indirect effects, observed power was above 80% when predicting work engagement (post-hoc power = 82.3%), whereas for subjective performance (post-hoc power = 68.3%), and OCB-I (post-hoc power = 58.4%) as outcomes observed power was below 80%. Finally, for the interaction effect involving daily competence need satisfaction, observed power was also below 80% (post-hoc power = 64.8%). In sum, the results of Study 2 largely replicate Study 1's

findings and observed power analyses highlight that the examined effects, for the most part, should remain stable if examined in another study with the same sample size.

Discussion

The profound knowledge of the general adverse effects of commuting on individuals and societies has not yet been matched by an equally elaborated investigation of the mechanisms and boundary conditions linking daily aversive morning commutes to employee effectiveness. In line with our propositions, the results of two daily diary studies support the depletion of employees' regulatory resources and flow experiences as focal mechanisms underlying the adverse day-specific impacts of aversive morning commutes on motivational (work engagement) and behavioral (in-role and extra-role behaviors) indicators of employee effectiveness. The proposed role of regulatory resources is implied by the interaction of an aversive morning commute with self-control demands in predicting flow experiences in Study 1 and directly supported by the sequential mediation via ego depletion in Study 2. We further tested whether the satisfaction of between- and within-person differences in basic needs satisfaction can protect employees against the joint overadditive depleting effects of aversive morning commutes and self-control demands. Our results indicate that for more general between-person differences in needs satisfaction the common features of autonomy and competence need satisfaction protect employees' flow experiences and associated effectiveness from the joint depleting effects of an aversive morning commute and self-control demands. For within-person differences, in needs satisfaction, our research identifies that day-specific competence need satisfaction exhibits a similar protective effect as between-person differences in autonomy and competence need satisfaction.

Theoretical Implications

Our research offers several theoretical implications. First, we specify the regulatory resource loss process that links an aversive morning commute to employee effectiveness.

Specifically, the present research contributes to a better understanding of the link between an aversive morning commute and employee effectiveness by expanding upon the role of regulatory resource depletion and flow experiences as underlying mechanisms. Study 1 shows that flow experiences and work engagement are related across the whole workday. Study 2 expands these findings by demonstrating time-lagged relations between ego depletion after an aversive commute, flow experiences, and associated employee effectiveness. From a theoretical perspective, these time-lagged relations are particularly relevant because they emphasize the role of flow as both a resource-demanding (Csikszentmihalyi et al., 2005; Debus et al., 2014) and once reached a resource-recovering psychological state. Notably, research has mostly focused on the resource-recovering function of flow, thus leaving some room for theorizing about the resource-demanding nature of entering states of flow (see Sonnentag et al., 2012).

Second, by conceptualizing day-specific work-related self-control demands as a moderator of the proposed mediation model, we provide further evidence for the overadditive effects of coping with multiple self-control related stressors before and at work (van Woerkom et al., 2016). Previous cross-sectional studies have demonstrated that more stable work-related self-control demands interact to predict impaired well-being (Diestel & Schmidt, 2011). Our research extends these findings by demonstrating that akin to the interactive effects of these general self-control demands, short-term day-specific demands on self-control exhibit similar interactive effects and overtax employees' regulatory resources. We develop a theoretical explanation for these overadditive effects by integrating self-regulation and COR theory. In particular, the results of Study 2, which demonstrate an interactive effect of ego depletion and impulse control demands on flow experiences when daily competence need satisfaction is low, support our theoretical reasoning that the depletion of regulatory resources is associated with the tendency to conserve remaining regulatory resources. In turn, employees must invest regulatory resources not

only to deal with impulse control demands but also to overcome the urge to preserve regulatory resources, which overtaxes their pools of regulatory resource and prevents flow experiences. Thus, our research contributes to self-regulation theory by explaining why coping with multiple self-control demands is "really bad" for employees' regulatory resources (Diestel & Schmidt, 2011).

Third, our research also sheds light on the role of inter- and intraindividual differences in basic needs satisfaction as buffering moderators of the interplay of ego depletion following an aversive morning commute and self-control demands. In Study 1, we address the call for conceptual frameworks that incorporate both day-specific and general capacities (Luthans & Youseef, 2007). In Study 2, we test for homology across levels, thereby extending recent research suggesting that within-person fluctuations in needs satisfaction may also play a pivotal role in predicting employee effectiveness (e.g., De Gieter et al., 2018; Hewett et al., 2017; Reis et al., 2000). We found support for the proposed three-way interactions of person- and day-level competence need satisfaction in both studies. As such, our findings particularly highlight the importance of competence need satisfaction as a general and a day-specific motivating contingency that can protect employees from the joint overadditive effects of ego depletion through an aversive morning commute and self-control demands. These findings strongly correspond with the theoretical notion and empirical evidence that the challenge-skill balance of an activity is a crucial determinant for experiencing flow (Fong et al., 2015). This balance is also a crucial characteristic of high competence need satisfaction (Van den Broeck et al., 2010). Thus, the theoretical match of competence need satisfaction as a moderator with flow as an outcome of the proposed three-way interaction may explain the consistent moderating effects of competence needs satisfaction across levels found in both studies (see also De Jonge & Dorman, 2006).

Study 1 also supported the moderating effect of person-level autonomy need satisfaction,

whereas there was no corresponding effect in Study 2. However, our findings also indicate that not the unique proportions of variance of autonomy or competence needs satisfaction (i.e., obtained through orthogonalizing each need from the remaining two needs) accounts for the proposed buffering effect but rather the shared variance among the autonomy and competence needs satisfaction variables. This interpretation is also supported by the corresponding patterns of the three-way interaction effects for autonomy and competence needs satisfaction in Study 1 as well as the fact that these interaction effects only become significant once the collinearity between these needs is removed from the model through residual centering. In other words, the protective function of both needs results from the high overlap of these needs on the between-person level. The differential evidence for the three-way interaction of autonomy need satisfaction on the between- as compared to the within-person level highlights that despite convincing theoretical arguments for homologous effects, it is still important to empirically test such effects (Chen et al., 2005). A theoretical explanation for the relative importance of general rather than short-term day-specific autonomy need satisfaction could lie in the ambivalent resource-related role of autonomy satisfaction on the day-level. A high level of daily autonomy need satisfaction means that compared to the employee's mean level of autonomy need satisfaction, an employee feels more autonomous at work on that day. This above-average level of autonomy entails that the employee may not have automatic scripts for deciding how to work on that day, meaning they need to make conscious decisions to organize, and implement tasks. Accordingly, they may not benefit from additional regulatory resources provided by autonomy need satisfaction. A high level of general autonomy need satisfaction, in contrast, means that employees regularly perceive they can do their work the way they deem best, thus allowing them to develop automated scripts for making most use of the autonomy they have. Hence, they make better use of the autonomy to conduct their work

with self-developed routines that they feel work best for their resource levels, thus leaving them with a more fueled resource pool than their counterparts who experience less autonomy need satisfaction. This argument is supported by theorizing on the double meaning of job control which outlines that high control is only beneficial for those who can handle it (Meier et al., 2008).

Neither person- nor day-level relatedness need satisfaction moderated the proposed relationships. This points to a higher relevance of cognitive aspects of motivation rather than a more general resource recovering function of basic needs satisfaction for experiencing flow at work in the face of demands that deplete regulatory resources. In line with this notion, cognitive evaluation theory—a sub-theory of self-determination theory (Deci & Ryan, 1985)—has focused on autonomy and competence needs satisfaction as key psychological constructs to explain why some people find it easier to experience flow (Abuhamdeh, 2012; Kowal & Fortier, 1999). It is conceivable, however, that the protecting role of relatedness need satisfaction in the face of overadditive demands for experiencing flow foremost applies in situations where work involves social interactions (e.g., teamwork, customer contact). Accordingly, the three-way interaction for relatedness need satisfaction may be more likely to manifest in environments in which work requires interacting with others. As our study did not account for this contextual variable, future theorizing may consider it to clarify the motivational function of relatedness need satisfaction.

Limitations and Future Research

This research is not without limitations that may inform future research. First, our findings may have been influenced by the studies' context. The conditions of commuting in Germany and the UK are comparable to many countries in Europe and North America, implying that our results may be generalizable to these regions. However, while most commuters in the US (Desjardins, 2018) and in Germany (Federal Statistical Office Germany, 2017) take less than 30

minutes to commute from home to work, conditions are more challenging in many Asian countries. For example, the average commuting time in Beijing (China) is 52 minutes (World Economic Forum, 2017). Future research could investigate whether more challenging journeys to work are associated with even stronger impaired employee effectiveness. Relatedly, ethnicity (which we did not assess) and cultural norms for commuting may also influence these effects.

Second, we did not sample enough active commuters who cycled or walked to work to compare the motivational consequences of different types of commuting. Adam et al.'s research (2018) suggests that active commuting is more enjoyable than passive commuting (e.g., driving by car, going by public transport). Furthermore, evidence from multi-wave studies suggests that active commuting is less resource depleting and may even restore resources (Martin et al., 2014) and that it has positive effects on physiological fitness (Blond et al., 2019). Yet, to our knowledge, no diary study has so far investigated whether the mode of transport influences perceptions of day-specific commutes and how this in turn relates to employees' motivational states and behaviors. Exploring the unique effects of active versus passive commuting, a future within-person field experiment (Michiels & Onghena, 2019) may ask people to switch between active and passive modes of transport on different days. Relatedly, future research could explore the impact of teleworking, which renders commuting obsolete, on employees' day-specific flow experiences and associated effectiveness. In fact, the COVID-19 pandemic has forced many employees to suddenly work from home and stop commuting. We hope to see research that compares this exogenously induced "no-commute" situation with the subsequent situation (i.e., people commuting to work again). On the one hand, initial evidence indicates that no commute is not a satisfying solution either (Humagain & Singleton, 2020), as it makes it more difficult for people to separate home and work (Jachimowicz et al., in press). On the other hand, commuting in the context of the COVID-19 pandemic may be even more depleting, as it is associated with additional self-control demands

(e.g., wearing a mask, inhibiting the urge to touch one's face, controlling impulsive reactions toward others who are not adhering to social distancing guidelines). To conclude, disentangling the commute experience is a promising area for future research (Calderwood & Mitropoulos, 2020).

Third, to avoid additional confounding factors, we did not include shift workers in our studies. However, commuting at variable times (i.e., due to varying shift work) may be an additional contingency that warrants further investigation. As we initially outline, due to its recurring nature, for most employees commuting predominantly relies on automatic cognitive processing (Elfering et al., 2013), which is efficient in its consumption of regulatory resources (Baumeister et al., 2000). Indeed, transportation research (e.g., Chang & Mahmassani, 1988; Mahmassani, 1990; Mahmassani & Tong, 1986) shows that individuals gain experience with their route to work and become experts at estimating the best departure time with the goal to arrive on time (i.e., neither too early nor too late). However, commuting at different times should prevent forming commuting habits and an accurate estimation of optimal commuting times is much more difficult for shift workers because their commuting time varies (Nogland & Small, 1995). The commute of shift as compared to non-shift workers thus requires more controlled cognitive processing such as planning, monitoring the progress, and adapting the commute if necessary. To summarize, diving deeper into unusual commuting times could be a valuable extension of our model.

Lastly, a promising endeavor would be to extend our conceptual framework by zooming into positive commute experiences. Similar to the argument in the positive and negative affectivity literature (Cropanzano et al., 2003; Watson et al., 1999), the absence of a negative commute experience does not equal a positive commute experience. The latter refers to a stimulating activity that can come into place, for example, through inspiring conversations with one's co-workers on the way to work or by transitioning into one's work role by planning the

workday (Jachimowicz et al., in press). Such positive commute experiences may help maintain and expand regulatory resources, thereby facilitating flow experiences at work.

Practical Implications

First, our research highlights that for organizations the time is ripe to stop externalizing the costs of aversive morning commutes to individual employees or societies, but instead to explore new ways on how to reduce the negative consequences of aversive morning commutes. Organizationally determined work schedules can dictate the time frames during which employees must commute, thus making it difficult to optimize departure times to avoid high congestion (Nogland & Small, 1995). In other words, commuting is heavily determined by organizational practices (e.g., static work schedules) that often increase the likelihood of encountering unfavorable external circumstances (e.g., commuting during rush hours). An immediate intervention could be to reduce the aversiveness of the commute experience by providing flexible work schedules. This would allow employees to travel off-peak and has been associated with improved physical and mental health as well as higher productivity (VitalityHealth, 2017).

Second, organizations might consider that high competence need satisfaction protects employees from the joint adverse consequences of an aversive morning commute and self-control demands. Thus, a reasonable implication is to increase employees' general, as well as daily competence need satisfaction. Promising approaches to improve general levels of competence need satisfaction are, for example, interventions to enhance employees' work-related skills (Ryan & Deci, in press) or to equip them with strategies to increase their perceived competence despite high work demands (Weigelt et al., 2018). On a daily level, managers with a good knowledge of their employees' skillsets could assign tasks appropriate for their employees' skill levels and offer support for challenging work tasks (Van den Broeck et al., 2016).

Third, turning to a broader level of policy implications, governments can play a pivotal role

in reducing aversive commute experiences. Since delays are among the most prevalent aversive commute experiences (Gatersleben & Uzzell, 2007), investments in infrastructure (e.g., intelligent traffic lights, automatic speed limits) and public transport (e.g., more trains, networks optimized by machine learning approaches) could reduce aversive commutes. Further, policy decisions can help change people's preferred ways of commuting, thus leading to a potentially more balanced capacity utilization. For example, research has shown that investment in safe cycling lanes increases the number of people who cycle to work (Pucher & Buehler, 2017).

Finally, societal beliefs and norms about work-/life spaces also play a role in determining how we commute. For many decades, architects separated the space for work, life, and recreation (De Jong & Schuilenburg, 2006). While this improved unhygienic living conditions in the past, today's higher production standards have made this function obsolete in many countries. Instead, increases in property prices in city centers cause both employees and organizations to move to more rural areas increasing commuting duration (Ingraham, 2017; Zhu et al., 2017). Rethinking the integration of work and life spheres is thus a question for our communities and policymakers alike. In that regard, it is possible that the recent shift toward "working from home" due to the COVID-19 pandemic results in a reconsideration of how we separate work and life.

Conclusion

Although commuting is an everyday experience for everyone who works outside the home, its dynamic nature and implications for daily life in organizations have been largely overlooked. We provided a conceptual framework outlining the motivational consequences of an aversive commute from a self-regulatory resource perspective and explored work-related basic needs satisfaction as resilience factors against its adverse effects. We hope that our work inspires scholars and practitioners alike to engage in a constructive dialogue to help employees to smoothly flow to work so that they can experience more flow at work.

References

Abuhamdeh, S. (2012). A conceptual framework for the integration of flow theory and cognitive evaluation theory. In S. Engeser, *Advances in flow research* (pp. 109-121). New York, NY: Springer. https://doi.org/10.1007/978-1-4614-2359-1_6

Adam, Z., Walasek, L., & Meyer, C. (2018). Workforce commuting and subjective well-being. *Travel Behaviour and Society, 13*, 183–196. http://dx.doi.org/10.1016/j.tbs.2018.08.006

Bakker, A. B., Oerlemans, W., Demerouti, E., Slot, B. B., & Ali, D. K. (2011). Flow and performance: A study among talented Dutch soccer players. *Psychology of Sport and Exercise, 12*(4), 442–450. https://doi.org/10.1016/j.psychsport.2011.02.003

Baumeister, R. F., Muraven, M., & Tice, D. M. (2000). Ego depletion: A resource model of volition, self-regulation, and controlled processing. *Social Cognition, 18*(2), 130–150. https://doi.org/10.1521/soco.2000.18.2.130

Beal, D. J., & Ghandour, L. (2011). Stability, change, and the stability of change in daily workplace affect. *Journal of Organizational Behavior, 32*(4) 526–546. https://doi.org/10.1002/job.713

Binnewies, C., Sonnentag, S., & Mojza, E. J. (2009). Daily performance at work: Feeling recovered in the morning as a predictor of day-level job performance. *Journal of Organizational Behavior, 30*(1), 67-93. https://doi.org/10.1002/job.541

Bliese, P. D., & Wang, M. (2020). Results provide information about cumulative probabilities of finding significance: Let's report this information. *Journal of Management, 46*(7), 1275-1288. https://doi.org/10.1177/0149206319886909

Blond, M. B., Rosenkilde, M., Gram, A. S., Tindborg, M., Christensen, A. N., Quist, J. S., & Stallknecht, B. M. (2019). How does 6 months of active bike commuting or leisure-time exercise affect insulin sensitivity, cardiorespiratory fitness and intra-abdominal fat? A randomised controlled trial in individuals with overweight and obesity. *British Journal of Sports Medicine, 53*(18), 1183-1192. https://doi.org/10.1136/bjsports-2018-100036

Browne, R. (2018, May 30). *70% of people globally work remotely at least once a week, study says.* CNBC. https://www.cnbc.com/2018/05/30/70-percent-of-people-globally-work-remotely-at-least-once-a-week-iwg-study.html

Buehler, R., & Pucher, J. (2012). Cycling to work in 90 large American cities: new evidence on the role of bike paths and lanes. *Transportation, 39*(2), 409–432. https://doi.org/10.1007/s11116-011-9355-8

Calderwood, C., & Mitropoulos, T. (2020). Commuting spillover: A Systematic review and agenda for research. *Journal of Organizational Behavior.* Advanced online publication, https://doi.org/10.1002/job.2462

Call, M. L., & Ployhart, R. E. (in press). A theory of firm value capture from employee job performance: A multi-disciplinary perspective. *Academy of Management Review.* Advanced online publication, https://doi.org/10.5465/amr.2018.0103

Chang, G. L., & Mahmassani, H. S. (1988). Travel time prediction and departure time adjustment behavior dynamics in a congested traffic system. *Transportation Research Part B: Methodological, 22*(3), 217–232. https://doi.org/10.1016/0191-2615(88)90017-3

Chen, G., Bliese, P. D., & Mathieu, J. E. (2005). Conceptual framework and statistical procedures for delineating and testing multilevel theories of homology. *Organizational Research Methods, 8*(4), 375–409. https://doi.org/10.1177/1094428105280056

Chiniara, M., & Bentein, K. (2016). Linking servant leadership to individual performance: Differentiating the mediating role of autonomy, competence and relatedness need satisfaction. *The Leadership Quarterly, 27*(1), 124–141. https://doi.org/10.1016/j.leaqua.2015.08.004

Chong, S., Huang, Y., & Chang, C.-H. (D.) (2020). Supporting interdependent telework employees: A Moderated-mediation model linking daily COVID-19 task setbacks to next-day work withdrawal. *Journal of Applied Psychology, 105*(12), 1408–1422. http://dx.doi.org/10.1037/apl0000843

Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. P*ersonnel Psychology, 64*(1), 89–136. https://doi.org/10.1111/j.1744-6570.2010.01203.x

Ciarocco, N., Twenge, J. M., Muraven, M., & Tice, D. M. (2010). The state self-control capacity scale: Reliability, validity, and correlations with physical and psychological stress. *Unpublished manuscript.*

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Coria, J., & Zhang, X. B. (2017). Optimal environmental road pricing and daily commuting patterns. *Transportation Research Part B: Methodological, 105*, 297–314. https://doi.org/10.1016/j.trb.2017.09.016

Cropanzano, R., Weiss, H. M., Hale, J. M., & Reb, J. (2003). The structure of affect: Reconsidering the relationship between negative and positive affectivity. *Journal of Management, 29*(6), 831-857. https://doi.org/10.1016/S0149-2063(03)00081-3

Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety: Experiencing flow in work and play.* San Francisco: Jossey-Bass.

Csikszentmihalyi, M., Abuhamdeh, S., & Nakamura, J. (2005). Flow. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 598–608). New York, NY, US: Guilford Publications.

Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology, 56*(5), 815–822. https://doi.org/10.1037/0022-3514.56.5.815

Dang, J. (2018). An updated meta-analysis of the ego depletion effect. *Psychological Research, 82*(4), 645–651. https://doi.org/ 10.1007/s00426-017-0862-x

Dauth, W., & Haller, P. (2020). Is there loss aversion in the trade-off between wages and commuting distances? *Regional Science and Urban Economics,* 83, 103527.

Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal*

Dawson, J. F., & Richter, A. W. (2006). Probing three-way interactions in moderated multiple regression: development and application of a slope difference test. *Journal of Applied Psychology, 91*(4), 917–926. https://doi.org/10.1037/0021-9010.91.4.917

Debus, M. E., Sonnentag, S., Deutsch, W., & Nussbeck, F. W. (2014). Making flow happen: The effects of being recovered on work-related flow between and within days. *Journal of Applied Psychology, 99*(4), 713–722. https://doi.org/10.1037/a0035881

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York, NY: Plenum.

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. https://doi.org/10.1207/S15327965PLI1104_01

De Cooman, R., Stynen, D., Van den Broeck, A., Sels, L., & De Witte, H. (2013). How job characteristics relate to need satisfaction and autonomous motivation: Implications for work effort. *Journal of Applied Social Psychology, 43*(6), 1342-1352. https://doi.org/10.1111/jasp.12143

De Gieter, S., Hofmans, J., & Bakker, A. B. (2018). Need satisfaction at work, job strain, and performance: A diary study. *Journal of Occupational Health Psychology, 23*(3), 361–372. https://doi.org/10.1037/ocp0000098

De Jong, A., & Schuilenburg, M. (2006). *Mediapolis: Popular culture and the city.* Rotterdam: 010 Publisher.

De Jonge, J., & Dormann, C. (2006). Stressors, resources, and strain at work: a longitudinal test of the triple-match principle. *Journal of Applied Psychology, 91*(5), 1359–1374. https://doi.org/10.1037/0021-9010.91.5.1359

Demerouti, E., Bakker, A. B., Sonnentag, S., & Fullagar, C. J. (2012). Work-related flow and energy at work and at home: A study on the role of daily recovery. *Journal of Organizational Behavior, 33*(2), 276–295. https://doi.org/10.1002/job.760

Desjardins, J. (2018, April 1). *Average commute to work by state and city.* Visual Capitalist. http://www.visualcapitalist.com/average-commute-u-s-states-cities/

Diestel, S., Rivkin, W., & Schmidt, K. H. (2015). Sleep quality and self-control capacity as protective resources in the daily emotional labor process: Results from two diary studies. *Journal of Applied Psychology, 100*(3), 809–827. https://doi.org/10.1037/a0038373

Diestel, S., & Schmidt, K.-H. (2011). Costs of simultaneous coping with emotional dissonance and self-control demands at work: Results from two German samples. *Journal of Applied Psychology, 96*(3), 643–653. https://doi.org/10.1037/a0022134

Dumas, T. L., & Perry-Smith, J. E. (2018). The paradox of family structure and plans after work: Why single childless employees may be the least absorbed at work. *Academy of Management Journal, 61*(4), 1231–1252. https://doi.org/10.5465/amj.2016.0086

Dyer, N. G., Hanges, P. J., & Hall, R. J. (2005). Applying multilevel confirmatory factor analysis techniques to the study of leadership. *The Leadership Quarterly, 16*(1), 149–167. https://doi.org/10.1016/j.leaqua.2004.09.009

Elfering, A., Grebner, S., & de Tribolet-Hardy, F. (2013). The long arm of time pressure at work: Cognitive failure and commuting near-accidents. *European Journal of Work and Organizational Psychology, 22*(6), 737–749. https://doi.org/10.1080/1359432X.2012.704155

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: a new look at an old issue. *Psychological Methods, 12*(2), 121–138. https://doi.org/10.1037/1082-989X.12.2.121

Engeser, S., & Rheinberg, F. (2008). Flow, performance and moderators of challenge-skill balance. *Motivation and Emotion, 32*(3), 158–172. https://doi.org/10.1007/s11031-008-9102-4

Engeser, S., & Schiepe-Tiska, A. (2012). Historical lines and an overview of current research on flow. In S. Engeser, *Advances in flow researc*h (pp. 1-22). New York, NY: Springer.

Fairclough, S. H., Venables, L., & Tattersall, A. (2005). The influence of task demand and learning on the psychophysiological response. *International Journal of Psychophysiology, 56*(2), 171–184. https://doi.org/10.1016/j.ijpsycho.2004.11.003

Federal Statistical Office Germany (2012). *Commuters.* Destatis Statistisches Bundesamt. https://www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/Arbeitsmarkt/Erwerbstaetigkeit/TabellenArbeitskraefteerhebung/Berufspendler.html

Federal Statistical Office Germany (2017, August 22). *Commuting in Germany.* Destatis. https://www.destatis.de/DE/ZahlenFakten/ImFokus/Arbeitsmarkt/PendlerArbeitsweg.html

Fong, C. J., Zaleski, D. J., & Leach, J. K. (2015). The challenge–skill balance and antecedents of flow: A meta-analytic investigation. *The Journal of Positive Psychology, 10(*5), 425–446. https://doi.org/10.1080/17439760.2014.967799

Fosgerau, M., Kim, J., & Ranjan, A. (2018). Vickrey meets Alonso: Commute scheduling and congestion in a monocentric city. *Journal of Urban Economics, 105*, 40–53. https://doi.org/10.1016/j.jue.2018.02.003

Gabriel, A. S., Lanaj, K., & Jennings, R. E. (2020). Is one the loneliest number? A within-person examination of the adaptive and maladaptive consequences of leader loneliness at work. *Journal of Applied Psychology.* Advance online publication. https://doi.org/10.1037/apl0000838

Gabriel, A. S., Podsakoff, N. P., Beal, D. J., Scott, B. A., Sonnentag, S., Trougakos, J. P., & Butts, M. M. (2019). Experience sampling methods: a discussion of critical trends and considerations for scholarly advancement. *Organizational Research Methods, 22*(4), 969–1006. https://doi.org/10.1177/1094428118802626

Gatersleben, B., & Uzzell, D. (2007). Affective appraisals of the daily commute: comparing perceptions of drivers, cyclists, walkers, and users of public transport. *Environment and Behavior*, *39*(3), 416–431. https://doi.org/10.1177/0013916506294032

Geldhof, G. J., Pornprasertmanit, S., Schoemann, A. M., & Little, T. D. (2013). Orthogonalizing through residual centering. educational and psychological measurement. *Educational and Psychological Measurement, 73*(1), 27–46. https://doi.org/10.1177/0013164412445473

Gerdeman, D. (2019, March 18). *Stuck in commuter hell? You can still be productive.* HBSWK Harvard Business School Working Knowledge. https://hbswk.hbs.edu/item/stuck-in-commuter-hell-you-can-still-be-productive

Giacomantonio, M., Jordan, J., Fennis, B. M., & Panno, A. (2014). When the motivational consequences of ego depletion collide: Conservation dominates over reward-seeking. *Journal of Experimental Social Psychology, 55*, 217–220. https://doi.org/10.1016/j.jesp.2014.07.009

Halbesleben, J. B. (2010). A meta-analysis of work engagement: Relationships with burnout, demands, resources, and consequences. In A. B. Bakker, & M. P. Leiter (Eds.), W*ork engagement: A handbook of essential theory and research* (pp. 102–117). Hove, East Sussex, UK: Psychology Press.

Halbesleben, J. R., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the "COR" understanding the role of resources in conservation of resources theory. *Journal of Management, 40(*5), 1334–1364. https://doi.org/10.1177/0149206314527130

Hewett, R., Haun, V. C., Demerouti, E., Rodríguez Sánchez, A. M., Skakon, J., & De Gieter, S. (2017). Compensating need satisfaction across life boundaries: A daily diary study. *Journal of Occupational and Organizational Psychology, 90*(2), 270–279. https://doi.org/10.1111/joop.12171

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hobfoll, S. E., & Shirom, A. (2001). Conservation of resources theory: Applications to stress and management in the workplace. In R. T. Golembiewski (Ed.), *Handbook of organizational behavior* (pp. 57–80). New York, NY, US: Marcel Dekker.

Hobfoll, S. E., Halbesleben, J., Neveu, J.-P., & Westman, M. (2018). Conservation of resources in the organizational context: the reality of resources and their consequences. *Annual Review of Organizational Psychology and Organizational Behavior, 5*(1), 103–128. https://doi.org/10.1146/annurev-orgpsych-032117-104640

Hofmann, D. A., & Gavin, M. B. (1998). Centering decisions in hierarchical linear models: Implications for research in organizations. *Journal of Management, 24*(5), 623–641. https://doi.org/10.1016/S0149-2063(99)80077-4

Hu, L., & Bentler, p. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Humagain, P., & Singleton, P. A. (2020). Investigating travel time satisfaction and actual versus ideal commute times: A path analysis approach. *Journal of Transport & Health,* 16, 100829. https://doi.org/10.1016/j.jth.2020.100829

Ilies, R., Wagner, D., Wilson, K., Ceja, L., Johnson, M., DeRue, S., et al. (2017). Flow at work and basic psychological needs: Effects on well-being. *Applied Psychology, 66*(1), 3–24. https://doi.org/10.1111/apps.12075

Ingraham, C. (2017, February 22). *The American commute is worse today than it's ever been.* The Washington Post. https://www.washingtonpost.com/news/wonk/wp/2017/02/22/the-

1338 american-commute-is-worse-today-than-its-ever-
1339 been/?noredirect=on&utm_term=.f3b0977bb709

1340 Jachimowicz, J., Lee, J. J., Staats, B. R., Menges, J., & Gino, F. (in press). Between home and
1341 work: Commuting as an opportunity for role transitions. *Organization Science.*
1342 https://doi.org/10.1287/orsc.2020.1370

1343 Johansson, C., Lövenheim, B., Schantz, P., Wahlgren, L., Almström, P., Markstedt, A., ... &
1344 Sommar, J. N. (2017). Impacts on air pollution and health by changing commuting from
1345 car to bicycle. *Science of the Total Environment, 584-585*, 55–63. https://doi.org/
1346 10.1016/j.scitotenv.2017.01.145

1347 Kahneman, D., & Krueger, A. B. (2006). Developments in the measurement of subjective well-
1348 being. *Journal of Economic Perspectives, 20*(1), 3–24. https://doi.org/
1349 10.1257/089533006776526030

1350 Kaplan, S., & Berman, M. G. (2010). Directed attention as a common resource for executive
1351 functioning and self-regulation. *Perspectives on Psychological Science, 5*(1), 43–57.
1352 https://doi.org/10.1177/1745691609356784

1353 Kasa, M., & Hassan, Z. (2015). The role of flow between burnout and organizational citizenship
1354 behavior (OCB) among hotel employees in Malaysia. *Procedia-Social and Behavioral*
1355 *Sciences, 211*, 199–206. https//doi.org/10.1016/j.sbspro.2015.11.084

1356 Knight, C., Patterson, M., & Dawson, J. (2017). Building work engagement: A systematic review
1357 and meta-analysis investigating the effectiveness of work engagement interventions.
1358 *Journal of Organizational Behavior, 38*(6), 792–812. https://doi.org/10.1002/job.2167

1359 Koopman, J., Lanaj, K., & Scott, B. A. (2016). Integrating the bright and dark sides of OCB: A
1360 daily investigation of the benefits and costs of helping others. *Academy of Management*
1361 *Journal, 59*(2), 414–435. https://doi.org/10.5465/amj.2014.0262

1362 Koslowsky, M. (1997). Commuting stress: problems of definition and variable identification.
1363 *Applied Psychology, 46*(2), 153–173. https://doi.org/10.1111/j.1464-0597.1997.tb01222.x

1364 Kowal, J., & Fortier, M. S. (1999). Motivational determinants of flow: Contributions from self-
1365 determination theory. *The Journal of Social Psychology, 139*(3), 355–368.
1366 https://doi.org/10.1080/00224549909598391

1367 LaHuis, D. M., Hartman, M. J., Hakoyama, S., & Clark, P. C. (2014). Explained variance
1368 measures for multilevel models. *Organizational Research Methods, 17*(4), 433–451.
1369 https://doi.org/10.1177/1094428114541701

1370 Lanaj, K., Johnson, R. E., & Barnes, C. M. (2014). Beginning the workday yet already depleted?
1371 Consequences of late-night smartphone use and sleep. *Organizational Behavior and*
1372 *Human Decision Processes, 124*(1), 11–23. https://doi.org/10.1016/j.obhdp.2014.01.001

1373 Laurance W.F., Goosem M., Laurance S.G. (2009). Impacts of roads and linear clearings on
1374 tropical forests. *Trends in Ecolofy & Evolution, 24*(12), 659–669.
1375 https://doi.org/10.1016/j.tree.2009.06.009

1376 Leary, M. R. (2005). Sociometer theory and the pursuit of relational value: Getting to the root of
1377 self-esteem. *European Review of Social Psychology, 16*(1), 75–111.
1378 https://doi.org/10.1080/10463280540000007

Leroy, S., Schmidt, A., & Madjar, N. (2020). Interruptions and task transitions: Understanding their characteristics, processes, and consequences. *Academy of Management Annals, 14*(2), 661-694. https://doi.org/10.5465/annals.2017.0146

Lorenz, O. (2018). Does commuting matter to subjective well-being? *Journal of Transport Geography, 66*, 180–199. https://doi.org/10.1016/j.jtrangeo.2017.11.019

Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. *Journal of Management, 33*(3), 321–349. https://doi.org/10.1177/0149206307300814

Ma, L., & Ye, R. (2019). Does daily commuting behavior matter to employee productivity? *Journal of Transport Geography, 76*, 130–141. https://doi.org/10.1016/j.jtrangeo.2019.03.008

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99–128. https://doi.org/10.1207/s15327906mbr3901_4

Mahmassani, H. S. (1990). Dynamic models of commuter behavior: Experimental investigation and application to the analysis of planned traffic disruptions. *Transportation Research Part A: General, 24*(6), 465–484. https://doi.org/10.1016/0191-2607(90)90036-6

Mahmassani, H. S., & Tong, C. C. (1986). Availability of information and dynamics of departure time choice: Experimental investigation. *Transportation Research Record,* (1085), 33–49.

Martin, A., Goryakin, Y., & Suhrcke, M. (2014). Does active commuting improve psychological wellbeing? Longitudinal evidence from eighteen waves of the British Household Panel Survey. *Preventive Medicine, 69,* 296–303. https://doi.org/10.1016/j.ypmed.2014.08.023

Matthews, G. (2002). Towards a transactional ergonomics for driver stress and fatigue. *Theoretical Issues in Ergonomics Science, 3*(2), 195–211. https://doi.org/10.1080/14639220210124120

Meier, L. L., Semmer, N. K., Elfering, A., & Jacobshagen, N. (2008). The double meaning of control: Three-way interactions between internal resources, job control, and stressors at work. *Journal of Occupational Health Psychology, 13*(3), 244–258. https://doi.org/: 10.1037/1076-8998.13.3.244

Menges, J. I., Tussing, D. V., Wihler, A., & Grant, A. M. (2017). When job performance is all relative: How family motivation energizes effort and compensates for intrinsic motivation. *Academy of Management Journal*, *60*(2), 695–719. https://doi.org/10.5465/amj.2014.0898

Michiels, B., & Onghena, P. (2019). Randomized single-case AB phase designs: Prospects and pitfalls. *Behavior Research Methods, 51*(6), 2454–2476. https://doi.org/10.3758/s13428-018-1084-x

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*(2), 247–259. https://doi.org/10.1037/0033-2909.126.2.247

Muraven, M., Gagné, M., & Rosman, H. (2008). Helpful Self-Control: Autonomy Support, Vitality, and Depletion. *Journal of Experimental Social Psychology, 44*(3), 573–585. https://doi.org/10.1016/j.jesp.2007.10.008

Muraven, M., Shmueli, D., & Burkley, E. (2006). Conserving self-control strength. *Journal of Personality and Social Psychology, 91*(3), 524–537. https://doi.org/10.1037/0022-3514.91.3.524

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus User's Guide: Statistical Analysis with Latent Variables (7th ed.).* Los Angeles, CA: Muthén & Muthén.

Newton, D. W., LePine, J. A., Kim, J. K., Wellman, N., & Bush, J. T. (2020). Taking engagement to task: The nature and functioning of task engagement across transitions. *Journal of Applied Psychology, 105*(1), 1–18. https://doi.org/10.1037/apl0000428

Nogland, R. B., & Small, K. (1995). Travel-time uncertainty, departure time choice, and the cost of morning commutes. *Transportation Research Record Journal of the Transportation Research Board, 1493*, 150–158.

Novaco, R. W., & Gonzalez, O. I. (2009). Commuting and well-being. In Y. A. Hamburger (Ed.), *Technology and psychological well-being* (pp. 174–205). New York, NY: Cambridge University Press.

Novaco, R. W., Stokols, D., & Milanesi, L. (1990). Objective and subjective dimensions of travel impedance as determinants of commuting stress. *American Journal of Community Psychology, 18*(2), 231–257. https://doi.org/10.1007/BF00931303

Office for National Statistics UK (2014, February 12). *Commuting and personal well-being.* The National Archives. http://webarchive.nationalarchives.gov.uk/20160105231823/http://www.ons.gov.uk/ons/rel/wellbeing/measuring-national-well-being/commuting-and-personal-well-being--2014/art-commuting-and-personal-well-being.html

Ohly, S., Göritz, A. S., & Schmitt, A. (2017). The power of routinized task behavior for energy at work. *Journal of Vocational Behavior, 103*(Part B), 132–142. https://doi.org/10.1016/j.jvb.2017.08.008

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research: An introduction and some practical recommendations. *Journal of Personnel Psychology, 9*(2), 79–93. https://doi.org/10.1027/1866-5888/a000009

Owens, B. P., Baker, W. E., Sumpter, D. M., & Cameron, K. S. (2016). Relational energy at work: Implications for job engagement and job performance. *Journal of Applied Psychology, 101*(1), 35-49. https://doi.org/10.1037/apl0000032

Palan, S., & Schitter, C. (2018). Prolific.ac—A subject pool for online experiments. *Journal of Behavioral and Experimental Finance, 17*, 22–27. https://doi.org/ 10.1016/j.jbef.2017.12.004

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology, 70,* 153–163. https://doi.org/10.1016/j.jesp.2017.01.006

Pinder, C. (2008). *Work motivation in organizational behavior (2nd ed.).* New York: Psychology Press.

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research, 42*(1), 185–227. https://doi.org/10.1080/00273170701341316

Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo confidence intervals for indirect effects. *Communication Methods and Measures*, *6*(2), 77–98. https://doi.org/10.1080/19312458.2012.679848

Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods, 15*(3), 209–233. https://doi.org/10.1037/a0020141

Pucher, J., & Buehler, R. (2017). Cycling towards a more sustainable transport future. *Transport Reviews*, *37*(6), 689–694. https://doi.org/10.1080/01441647.2017.1340234

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*(4), 419–435. https://doi.org/10.1177/0146167200266002

Rheinberg, F., Vollmeyer, R., & Engeser, S. (2003). Die Erfassung des Flow-Erlebens [The assessment of flow experience]. In J. Stiensmeier-Pelster & F. Rheinberg (Eds.), *Diagnostik von Selbstkonzept, Lernmotivation und Selbstregulation [Diagnosis of motivation and self-concept]* (pp. 261–279). Göttingen: Hogrefe.

Rivkin, W., Diestel, S., & Schmidt, K. H. (2015). Affective commitment as a moderator of the adverse relationships between day specific self-control demands and psychological well-being. *Journal of Vocational Behavior, 88*, 185–194. https://doi.org/10.1016/j.jvb.2015.03.005

Rivkin, W., Diestel, S., & Schmidt, K. H. (2018). Which daily experiences can foster well-being at work? A diary study on the interplay between flow experiences, affective commitment, and self-control demands. *Journal of Occupational Health Psychology, 23*(1), 99–111. https://doi.org/10.1037/ocp0000039

Robbins, S. P. & Judge, T. A. (2019). *Organizational Behavior (18th Edition).* Harlow, UK: Pearson.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*, 141–166. https://doi.org/10.1146/annurev.psych.52.1.141

Ryan, R. M., & Deci, E. L. (in press). Supporting autonomy, competence, and relatedness: The coaching process from a self-determination theory perspective. In P. Brownell, S. English, & J. Sabatine (Eds.), *The professional coach's desk reference*. New York, NY: Springer.

Schaeffer, M. H., Street, S. W., Singer, J. E., & Baum, A. (1988). Effects of control on the stress reactions of commuters. *Journal of Applied Social Psychology, 18*(11, PT 1), 944–957. https://doi.org/10.1111/j.1559-1816.1988.tb01185.x

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire a cross-national study. *Educational and Psychological Measurement, 66*(4), 701–716. https://doi.org/10.1177/0013164405282471

Schmidt, K.-H., Beck, R., Rivkin, W., & Diestel, S. (2016). Self-control demands at work and psychological strain: The Moderating Role of Physical Fitness. *International Journal of Stress Management, 23*(3), 255–275. https://doi.org/10.1037/str0000012

Schmidt, K. H., & Neubach, B. (2007). Self-control demands: A source of stress at work. *International Journal of Stress Management, 14*(4), 398–416. https://doi.org/10.1037/1072-5245.14.4.398

Schneider, B., Yost, A. B., Kropp, A., Kind, C., & Lam, H. 2018. Workforce engagement: What it is, what drives it, and why it matters for organizational performance. J*ournal of Organizational Behavior, 39*(4), 462–480. https://doi.org/10.1002/job.2244

Seay, B. (2019, July 26). *Tales of a frustrated commuter.* WGBH News. https://www.wgbh.org/news/local-news/2019/07/26/tales-of-a-frustrated-commuter

Shacham, S. (1983). A shortened version of the Profile of Mood States. *Journal of Personality Assessment, 47*(3), 305–306. https://doi.org/10.1207/s15327752jpa4703_14

Snijders, T.A.B., & Bosker, R.J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling (2nd Edition).* Sage.

Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: A new look at the interface between nonwork and work. *Journal of Applied Psychology, 88*(3), 518–528. https://doi.org/10.1037/0021-9010.88.3.518

Sonnentag, S., Binnewies, C., & Mojza, E. J. (2008). "Did you have a nice evening?" A day-level study on recovery experiences, sleep, and affect. *Journal of Applied Psychology, 93*(3), 674–684. https://doi.org/10.1037/0021-9010.93.3.674

Sonnentag, S., Mojza, E. J., Demerouti, E., & Bakker, A. B. (2012). Reciprocal relations between recovery and work engagement: The moderating role of job stressors. *Journal of Applied Psychology, 97*(4), 842–853. https://doi.org/10.1037/a0028292

Stokols, D., Novaco, R. W., Stokols, J., & Campbell, J. (1978). Traffic congestion, Type A behavior, and stress. *Journal of Applied Psychology, 63*(4), 467–480. https://doi.org/10.1037/0021-9010.63.4.467

Thompson, D. (2020, March 13). *The Coronavirus is creating a huge, stressful experiment in working from home.* The Atlantic. https://www.theatlantic.com/ideas/archive/2020/03/coronavirus-creating-huge-stressful-experiment-working-home/607945/

Tong, J., Chong, S. H., & Johnson, R. E. (2019). The indirect relations of workplace incivility with emotional exhaustion and supportive behaviors via self-blame: The moderating roles of observed incivility and trait emotional control. *Journal of Organizational Behavior, 40*(8), 931–946. https://doi.org/10.1002/job.2399

Van den Broeck, A., Ferris, D. L., Chang, C. H., & Rosen, C. C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management, 42*(5), 1195–1229. https://doi.org/10.1177/0149206316632058

Van den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the

work-related basic need satisfaction scale. *Journal of Occupational and Organizational Psychology, 83*(4), 981–1002. https://doi.org/10.1348/096317909X481382

Van der Leeden, R., Meijer, E., & Busing, F. M. T. A. (2008). Resampling multilevel models. In J. de Leeuw & E. Meijer (Eds.), *Handbook of multilevel analysis* (pp. 401-433). New York, NY, US: Springer Science + Business Media.

van Hooff, M. L., & Geurts, S. A. (2015). Need satisfaction and employees' recovery state at work: A daily diary study. *Journal of Occupational Health Psychology*, *20*(3), 377–387. https://doi.org/10.1037/a0038761

Van Ittersum, K. W. (2015). *The distictinvess of engagement and flow at work.* Unpublished dissertation, https://krex.k-state.edu/dspace/handle/2097/18974.

van Woerkom, M., Bakker, A. B., & Nishii, L. H. (2016). Accumulative job demands and support for strength use: Fine-tuning the job demands-resources model using conservation of resources theory. *Journal of Applied Psychology, 101*(1), 141–150. https://doi.org/10.1037/apl0000033

VitalityHealth (2017, May 22). Long commutes costing firms a week's worth of staff productivity. VitalityHealth. https://www.vitality.co.uk/media/long-commutes-costing-a-weeks-worth-of-productivity/

Walter, S. L., Seibert, S. E., Goering, D., & O'Boyle, E. H. (2019). A tale of two sample sources: Do results from online panel data and conventional data converge? *Journal of Business and Psychology, 34*(4), 425–452. https://doi.org/10.1007/s10869-018-9552-y

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. https://doi.org/10.1037/0022-3514.54.6.1063

Weigelt, O., Syrek, C. J., Schmitt, A., & Urbach, T. (2018). Finding peace of mind when there still is so much left undone–A diary study on how job stress, competence need satisfaction, and proactive work behavior contribute to work-related rumination during the weekend. *Journal of Occupational Health Psychology 24*(3), 373–386. https://doi.org/10.1037/ocp0000117

Williams, L. J. & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship behavior and in-role behaviors. *Journal of Management, 17*(3), 601–617. https://doi.org/10.1177/014920639101700305

Williams, L. J., O'Boyle, E. H., & Yu, J. (2020). Condition 9 and 10 tests of model confirmation: A review of James, Mulaik, and Brett (1982) and contemporary alternatives. *Organizational Research Methods, 23*(1), 6-29. https://doi.org/10.1177/1094428117736137

World Economic Forum (2017, April 4). *Think your commute is bad? Some Beijing workers spend six hours a day getting to work.* The World Economic Forum. https://www.weforum.org/agenda/2017/04/think-your-commute-is-bad-some-beijing-workers-travel-six-hours-to-and-from-work/

Wu, W., Wang, M. X., & Zhang, F. (2019). Commuting behavior and congestion satisfaction: Evidence from Beijing, China. *Transportation Research Part D: Transport and Environment, 67*, 553–564. https://doi.org/10.1016/j.trd.2018.12.023

Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationships between job resources, personal re- sources, and work engagement. *Journal of Vocational Behavior, 74*(3), 235–244. https://doi.org/10.1016/j.jvb.2008.11.003

Xanthopoulou, D., Bakker, A. B., Oerlemans, W. G., & Koszucka, M. (2018). Need for recovery after emotional labor: Differential effects of daily deep and surface acting. *Journal of Organizational Behavior, 39*(4), 481–494. https://doi.org/10.1002/job.2245

Ye, R., & Ma, L. (2019, August 1). It's official: Aussie work traffic is a nightmare. Retrieved from https://www.lifehacker.com.au/2019/08/its-official-aussie-work-traffic-is-an-absolute-nightmare/

Zhou, L., Wang, M., Chang, C. H., Liu, S., Zhan, Y., & Shi, J. (2017). Commuting stress process and self-regulation at work: Moderating roles of daily task significance, family interference with work, and commuting means efficacy. *Personnel Psychology, 70*(4), 891–922. https://doi.org/10.1111/peps.12219

Zhu, Z., Li, Z., Liu, Y., Chen, H., & Zeng, J. (2017). The impact of urban characteristics and residents' income on commuting in China. *Transportation research part D: Transport and Environment, 57*, 474–483. https://doi.org/10.1016/j.trd.2017.09.015

Table 1. *MCFA Results (Study 1 and Study 2)*

Study 1	χ2	df	RMSEA	CFI	SRMR between	SRMR within	S-B scaled χ2 Δ to Model 1	Δ df	p
Model 1: 3-Factors-Between , 4- Factors-Within	1053.97	395	.064	.914	.096	.059			
Model 2: 3-Factors-Between, 3- Factors-Within (Flow and work engagement as a single factor)	2089.59	398	.102	.780	.096	.090	1415.75	3	.000
Model 3: 1-Factor-Between (Basic needs satisfaction as a single factor), 4- Factors-Within	1146.810	398	.068	.903	.160	.059	681.730	3	.000
Model 4: 1-Factor-Between, 1-Factor-Within	4568.520	404	.158	.458	.160	.178	8263.710	9	.000
Study 2									
Model 1: 12-Factors-Within	4430.41	1824	.045	.904		.046			
Model 2: 10-Factors-Within (Basic needs satisfaction as a single factor)	6825.44	1845	.061	.816		.061	4245.89	21	.000
Model 3: 10-Factors-Within (Ego depletion, tension, and negative affect as a single factor)	6571.28	1845	.060	.826		.074	941.43	21	.000
Model 4: 10-Factors-Within (Work engagement, subjective performance, and OCB-I as a single factor)	6449.27	1845	.059	.830		.067	1079.27	21	.000

Note. df = Degrees of freedom, RMSEA= Root Mean Square Error of Approximation, CFI = comparative fit index, SRMR = Standardized Root Mean Square Residual, S-B = Satorra-Bentler

Table 2. *Means, Standard Deviations, and Intercorrelations (Study 1)*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Aversive morning commute - morning	-	**-0.20**	0.02	-0.09	**0.38**							
2. Flow experience - afternoon	-0.26	-	**-0.26**	**0.49**	-0.04							
3. Impulse control demands - afternoon	0.10	-0.26	-	**-0.15**	-0.06							
4. Work engagement - evening	-0.12	**0.77**	-0.22	-	0.09							
5. Commute time - morning (in minutes)	**0.48**	-0.27	-0.02	-0.10	-							
6. *Basic need satisfaction - autonomy*	-0.07	**0.53**	-0.25	**0.65**	-0.14	-						
7. *Basic need satisfaction - competence*	-0.03	**0.63**	**-0.30**	**0.61**	0.03	**0.70**	-					
8. *Basic need satisfaction - relatedness*	-0.03	0.26	-0.19	**0.29**	-0.24	**0.44**	0.21					
9. *Age*	-0.16	0.26	-0.11	0.13	-0.09	0.08	0.07	-				
10. *Gender* [a]	-0.20	0.04	-0.08	0.08	0.16	0.03	0.25	-0.24	-			
11. *Leadership position* [b]	0.08	-0.20	0.10	**-0.31**	-0.02	**-0.41**	**-0.41**	-0.27	**-0.40**	-		
12. *Distance to work (in km)*	0.10	-0.09	0.01	-0.10	**0.56**	0.02	0.24	-0.05	0.00	0.25	-	
M	2.47	5.08	2.45	4.01	32.74	3.83	3.91	4.05	38.00	1.43	1.75	19.40
SD	0.90	0.85	0.99	1.45	23.88	0.98	0.78	0.84	13.51	0.50	0.43	21.86

Note. [a]Gender (1 = female, 2 = male). [b]Leadership position (1 = yes, 2 = no). Correlations below the diagonal represent person-level correlations ($N = 53$). Correlations above the diagonal are day-level correlations ($N = 411$). Person-level variables in italic. Numbers in bold $p < .05$.

Table 3. *MSEM Results and Within-Person Conditional Indirect Effects of Aversive Morning Commute via Flow Experiences on Work Engagement (Study 1)*

	Model 1: Residual centered autonomy need satisfaction				Model 2: Residual centered competence need satisfaction				Model 3: Residual centered relatedness need satisfaction			
	Flow experience (FE)		Work engagement (WE)		Flow experience (FE)		Work engagement (WE)		Flow experience (FE)		Work engagement (WE)	
Between-person direct effects	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*
Intercept	5.165 (.125)	.000	3.891 (.193)	.000	5.169 (.129)	.000	3.892 (.194)	.000	5.163 (.129)	.000	3.888 (.193)	.000
Basic need satisfaction - autonomy (NSA)	-.119 (.158)	.454			.092 (.129)	.476			-.141 (.136)	.302		
Basic need satisfaction - competence (NSC)	.298 (.121)	.014			.473 (.146)	.001			.400 (.135)	.003		
Basic need satisfaction - relatedness (NSR)	.009 (.107)	.935			.014 (.116)	.905			.062 (.134)	.643		
Residual variance	.496 (.127)	.000	1.669 (.299)	.000	.492 (.141)	.000	1.665 (.298)	.000	.521 (.137)	.000	1.671 (.300)	.000
Within-person direct effects	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*
Commute time	-.002 (.002)	.118	.007 (.002)	.001	-.003 (.002)	.173	.007 (.002)	.000	-.002 (.002)	.152	.007 (.002)	.001
Aversive morning commute (AC)	-.153 (.050)	.002	-.043 (.043)	.325	-.171 (.054)	.001	-.043 (.043)	.318	-.157 (.051)	.002	-.043 (.043)	.320
Impulse control demands (IC)	-.259 (.067)	.000			-.254 (.067)	.000			-.251 (.067)	.000		
AC x IC	-.231 (.101)	.022			-.253 (.095)	.008			-.223 (.102)	.029		
AC x NSA	.074 (.108)	.494			.132 (.043)	.002			.010 (.078)	.898		
IC x NSA	-.216 (.152)	.154			-.058 (.078)	.455			-.074 (.103)	.471		
AC x IC x NSA	.002 (.212)	.991			.173 (.079)	.029			.042 (.156)	.788		
AC x NSC	.216 (.078)	.006			.241 (.149)	.107			.219 (.134)	.102		
IC x NSC	.036 (.076)	.634			.147 (.129)	.254			.122 (.119)	.304		
AC x IC x NSC	.253 (.103)	.015			.198 (.225)	.379			.202 (.208)	.331		
AC x NSR	.008 (.051)	.882			-.007 (.053)	.893			-.020 (.059)	.733		
IC x NSR	.103 (.072)	.155			.140 (.080)	.080			.203 (.089)	.022		
AC x IC x NSR	.012 (.093)	.896			-.026 (.099)	.795			-.031 (.110)	.778		
Flow experience (FE)			.483 (.062)	.000			.483 (.062)	.000			.483 (.062)	.000
Residual variance	.341 (.068)	.000	.374 (.041)	.000	.346 (.070)	.000	.374 (.041)	.000	.341 (.068)	.000	.374 (.041)	.000
Within-person conditional indirect effects									Estimate (SE)	*p*	LLCI	ULCI
Model 1: AC → FE → WE (Mean NSC, Mean IC)									-.074 (.026)	.002	**-.1290**	**-.0252**
Model 1: AC → FE → WE (Mean NSC, High IC)									-.145 (.045)	.001	**-.2386**	**-.0610**
Model 1: AC → FE → WE (Mean NSC, Low IC)									-.003 (.037)	.947	-.0773	.0680
Model 1: AC → FE → WE (High NSC, High IC)									-.007 (.062)	.937	-.1340	.1110
Model 1: AC → FE → WE (High NSC, Low IC)									.017 (.030)	.563	-.0426	.0768
Model 1: AC → FE → WE (Low NSC, High IC)									-.283 (.069)	.000	**-.4234**	**-.1531**
Model 1: AC → FE → WE (Low NSC, Low IC)									-.024 (.052)	.658	-.1292	.0759
Model 2: AC → FE → WE (High NSA, High IC)									-.046 (.051)	.355	-.1475	.0534
Model 2: AC → FE → WE (High NSA, Low IC)									.006 (.054)	.920	-.0993	.1142
Model 2: AC → FE → WE (Low NSA, High IC)									-.272 (.054)	.000	**-.3824**	**-.1721**
Model 2: AC → FE → WE (Low NSA, Low IC)									-.015 (.044)	.746	-.1056	.0675

Note. $N_{between}$ = 53; N_{within} = 411; *SE* = standard error; *LLCI* = lower-level confidence interval (95%); *ULCI* = upper-level confidence interval (95%). In each model, all effects were included simultaneously to predict flow experiences and work engagement. Confidence intervals, which do not include zero, are marked in bold; 95% confidence intervals for parameter estimates of the direct effects are available upon request.

Table 4. *Means, Standard Deviations, and Intercorrelations (Study 2)*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Aversive morning commute - morning	-	**0.19**	**0.09**	**0.15**	-0.06	0.01	-0.01	0.04	-0.02	**-0.10**	-0.07	**-0.08**	**0.34**				
2. Ego depletion - morning	**0.33**	-	**0.38**	**0.36**	**-0.33**	0.01	**-0.10**	**-0.13**	-0.07	**-0.29**	**-0.12**	**-0.11**	-0.03				
3. Negaitve affect - morning	**0.29**	**0.46**	-	**0.75**	**-0.16**	0.03	-0.03	-0.04	-0.02	**-0.18**	-0.07	0.04	0.03				
4. Tension - morning	**0.29**	**0.44**	**0.96**	-	**-0.21**	**0.09**	**-0.09**	**-0.14**	**-0.08**	**-0.23**	-0.07	0.05	0.04				
5. Flow experience - afternoon	**-0.29**	**-0.59**	**-0.25**	**-0.27**	-	-0.06	**0.28**	**0.37**	**0.21**	**0.39**	**0.19**	**0.15**	0.03				
6. Impulse control demands - afternoon	**0.31**	**0.30**	**0.30**	**0.34**	-0.15	-	**-0.09**	0.01	**-0.16**	**-0.10**	-0.06	0.01	-0.01				
7. Basic need satisfaction - autonomy - afternoon	**-0.27**	**-0.37**	-0.19	-0.19	**0.60**	**-0.32**	-	**0.39**	**0.21**	**0.22**	0.07	0.02	-0.03				
8. Basic need satisfaction - competence - afternoon	**-0.23**	**-0.45**	**-0.34**	**-0.37**	**0.74**	-0.16	**0.55**	-	**0.21**	**0.25**	**0.25**	**0.13**	0.05				
9. Basic need satisfaction - relatedness - afternoon	**-0.23**	**-0.29**	**-0.23**	**-0.28**	**0.59**	**-0.26**	**0.63**	**0.53**	-	**0.20**	**0.14**	**0.08**	0.00				
10. Work engagement - evening	**-0.32**	**-0.51**	**-0.27**	**-0.28**	**0.77**	-0.13	**0.55**	**0.52**	**0.49**	-	**0.46**	**0.26**	-0.03				
11. Subjective performance - evening	**-0.27**	**-0.41**	**-0.30**	**-0.31**	**0.72**	-0.06	**0.42**	**0.76**	**0.43**	**0.64**	-	**0.25**	0.00				
12. OCB - I - evening	-0.13	-0.15	**-0.24**	**-0.27**	**0.37**	-0.03	**0.38**	**0.36**	**0.67**	**0.42**	**0.34**	-	-0.05				
13. Commute time - morning (in minutes)	0.20	0.14	0.14	0.16	-0.19	0.13	-0.09	**-0.23**	-0.08	-0.11	**-0.28**	-0.02	-				
14. *Age*	-0.16	-0.14	0.00	-0.05	0.17	0.10	0.04	0.15	-0.03	0.13	0.17	-0.05	-0.01	-			
15. *Gender* [a]	-0.08	-0.08	0.12	0.11	-0.04	-0.12	0.02	-0.13	**-0.27**	0.05	-0.08	**-0.34**	0.19	0.19	-		
16. *Leadership position* [b]	0.07	0.09	0.18	0.13	-0.07	0.04	-0.18	-0.21	0.00	-0.07	-0.04	-0.11	0.04	-0.02	-0.01	-	
17. *Distance to work (in miles)*	0.00	0.04	-0.04	-0.01	-0.17	0.05	0.04	-0.11	-0.07	-0.01	-0.19	-0.02	**0.61**	0.12	**0.24**	-0.06	-
M	2.31	1.76	1.22	1.29	5.13	2.06	4.03	4.16	3.63	3.79	5.92	4.29	32.96	36.70	1.33	1.51	9.77
SD	0.55	0.61	0.44	0.51	0.86	1.00	0.81	0.69	0.98	0.94	0.93	1.12	23.99	10.42	0.47	0.50	10.91

Note. [a]Gender (1 = female, 2 = male). [b]Leadership position (1 = yes, 2 = no). Correlations below the diagonal are person-level correlations ($N = 91$). Correlations above the diagonal are day-level correlations ($N = 719$). Person-level variables in italic. Numbers in bold $p < .05$.

Table 5. *MSEM Results (Study 2)*

	Ego depletion		Model 1: Flow experience		Model 2: Flow experience		Model 3: Flow experience		Work engagement		Subjective performance		OCB - I	
Between-person direct effects			Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*
Intercept			5.127 (.089)	.000	5.125 (.089)	.000	5.128 (.089)	.000	3.795 (.099)	.000	5.944 (.093)	.000	4.295 (.115)	.000
Residual variance			.659 (.106)	.000	.662 (.106)	.000	.658 (.106)	.000	.833 (.139)	.000	.715 (.112)	.000	1.142 (.159)	.000
Within-person direct effects	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*	Estimate (SE)	*p*
Commute time (in minutes)	-.006 (.002)	.000	.001 (.002)	.580	.001 (.002)	.542	.001 (.002)	.589	-.002 (.001)	.255	.001 (.002)	.782	-.003 (.002)	.189
Negative Affect	.543 (.187)	.004	.011 (.117)	.925	.003 (.116)	.978	.009 (.116)	.941	.032 (.104)	.754	-.080 (.155)	.606	.069 (.138)	.619
Tension	.262 (.125)	.036	-.111 (.095)	.241	-.109 (.094)	.244	-.108 (.096)	.261	-.196 (.085)	.021	.040 (.124)	.750	.185 (.124)	.135
Aversive morning commute	.187 (.053)	.000	-.016 (.041)	.695	-.009 (.041)	.827	-.018 (.041)	.662	-.036 (.045)	.431	-.069 (.062)	.272	-.059 (.045)	.187
Ego Depletion (EG)			-.279 (.042)	.000	-.279 (.043)	.000	-.278 (.042)	.000	-.149 (.051)	.003	-.049 (.066)	.460	-.103 (.056)	.066
Flow experience									.303 (.045)	.000	.192 (.050)	.000	.138 (.049)	.005
Impulse control demands (IC)			-.022 (.036)	.547	-.016 (.035)	.660	-.021 (.036)	.551						
Basic need satisfaction - autonomy (NSA)			.120 (.083)	.149	.265 (.076)	.001	.141 (.084)	.093						
Basic need satisfaction - competence (NSC)			.529 (.084)	.000	.493 (.089)	.000	.510 (.089)	.000						
Basic need satisfaction - relatedness (NSR)			.162 (.056)	.004	.200 (.055)	.000	.146 (.056)	.010						
EG x IC			-.038 (.062)	.535	-.035 (.063)	.580	-.038 (.063)	.545						
EG x NSA			.174 (.126)	.167	.197 (.116)	.088	.137 (.118)	.245						
IC x NSA			.191 (.069)	.006	.154 (.065)	.018	.184 (.069)	.008						
EG x IC x NSA			-.052 (.086)	.544	.029 (.104)	.778	-.061 (.087)	.479						
EG x NSC			.092 (.115)	.424	-.029 (.123)	.812	-.041 (.124)	.741						
IC x NSC			-.053 (.128)	.678	-.101 (.137)	.460	-.118 (.130)	.365						
EG x IC x NSC			.196 (.121)	.105	.266 (.114)	.019	.212 (.108)	.050						
EG x NSR			-.302 (.093)	.001	-.322 (.098)	.001	-.328 (.101)	.001						
IC x NSR			.047 (.055)	.395	.006 (.045)	.900	.031 (.055)	.575						
EG x IC x NSR			-.055 (.109)	.615	-.035 (.107)	.742	-.042 (.114)	.710						
Residual Variance	.299 (.028)	.000	.335 (.030)	.000	.335 (.029)	.000	.336 (.030)	.000	.346 (.035)	.000	.550 (.112)	.000	.406 (.054)	.000

Note. SE = standard error; $N_{between}$ = 91; N_{within} = 719. In each model, all effects were included simultaneously to predict all endogenous variables. In Model 1 residual centering was applied to autonomy need satisfaction, in Model 2 to competence need satisfaction and in Model 3 to relatedness need satisfaction. Except for the estimates predicting flow experiences, all other estimates were identical across all three tested models. 95% confidence intervals for parameter estimates of the direct effects are available upon request.

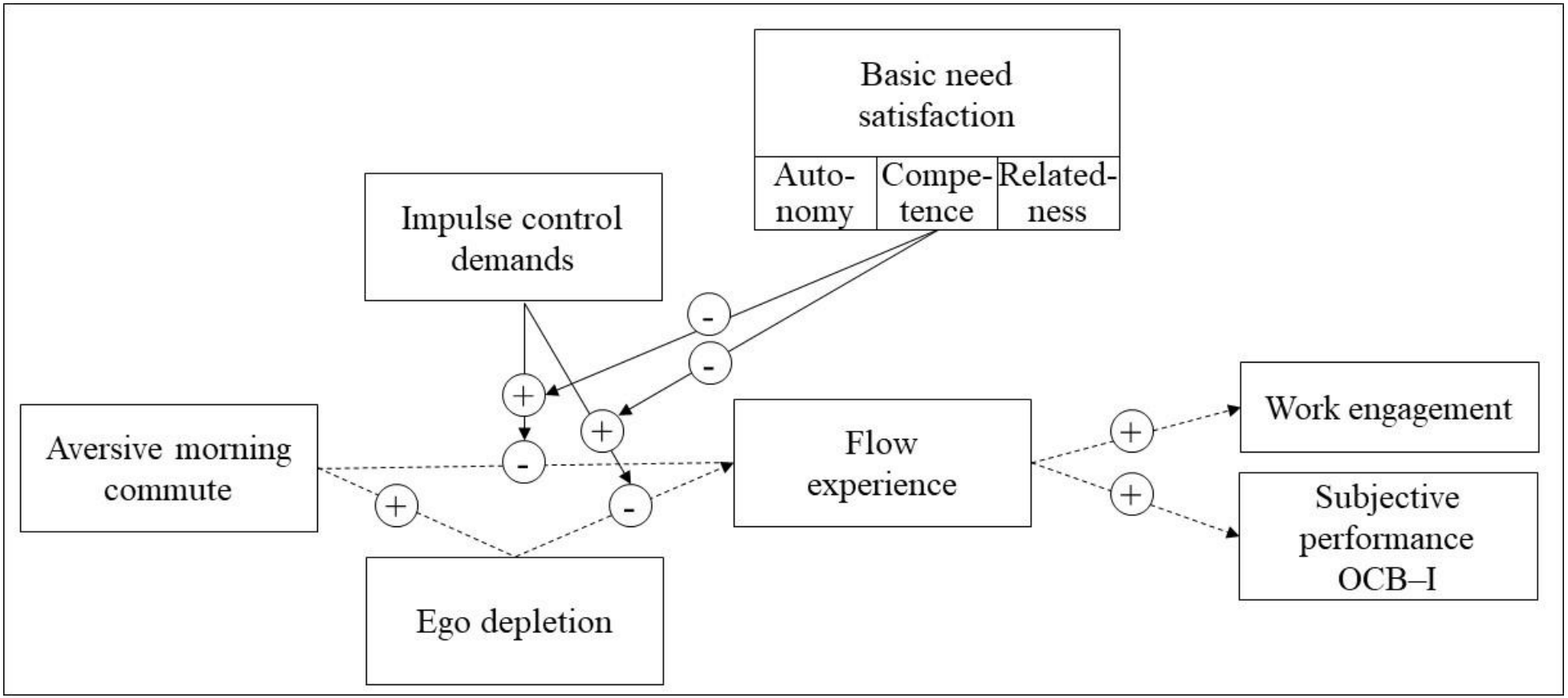
Table 6. *Within-Person Conditional Indirect Effects of Aversive Morning Commute via Ego Depletion and Flow Experience on Work Engagement, Subjective Performance, and OCB-I (Study 2).*

			Basic needs satisfaction	
			Mean	
Impulse control demands			Mean	
Outcome	Estimate (SE)	*p*	LLCI	ULCI
Work engagement	-.016 (.005)	.000	**-.0277**	**-.0064**
Subjective performance	-.010 (.004)	.000	**-.0193**	**-.0033**
OCB-I	-.007 (.003)	.005	**-.0146**	**-.0018**

	Basic need satisfaction - competence															
	High								Low							
Impulse control demands	High				Low				High				Low			
Outcome	Estimate (SE)	*p*	LLCI	ULCI	Estimate (SE)	*p*	LLCI	ULCI	Estimate (SE)	*p*	LLCI	ULCI	Estimate (SE)	*p*	LLCI	ULCI
Work engagement	-.014 (.007)	.006	**-.0302**	**-.0030**	-.019 (.007)	.000	**-.0355**	**-.0065**	-.020 (.008)	.000	**-.0373**	**-.0076**	-.010 (.005)	.013	**-.0218**	**-.0017**
Subjective performance	-.009 (.005)	.007	**-.0199**	**-.0018**	-.012 (.006)	.000	**-.0252**	**-.0034**	-.013 (.006)	.000	**-.0259**	**-.0040**	-.006 (.004)	.014	**-.0153**	**-.0010**
OCB-I	-.006 (.004)	.011	**-.0156**	**-.0009**	-.008 (.004)	.005	**-.0182**	**-.0020**	-.009 (.005)	.005	**-.0200**	**-.0021**	-.005 (.003)	.018	**-.0107**	**-.0006**

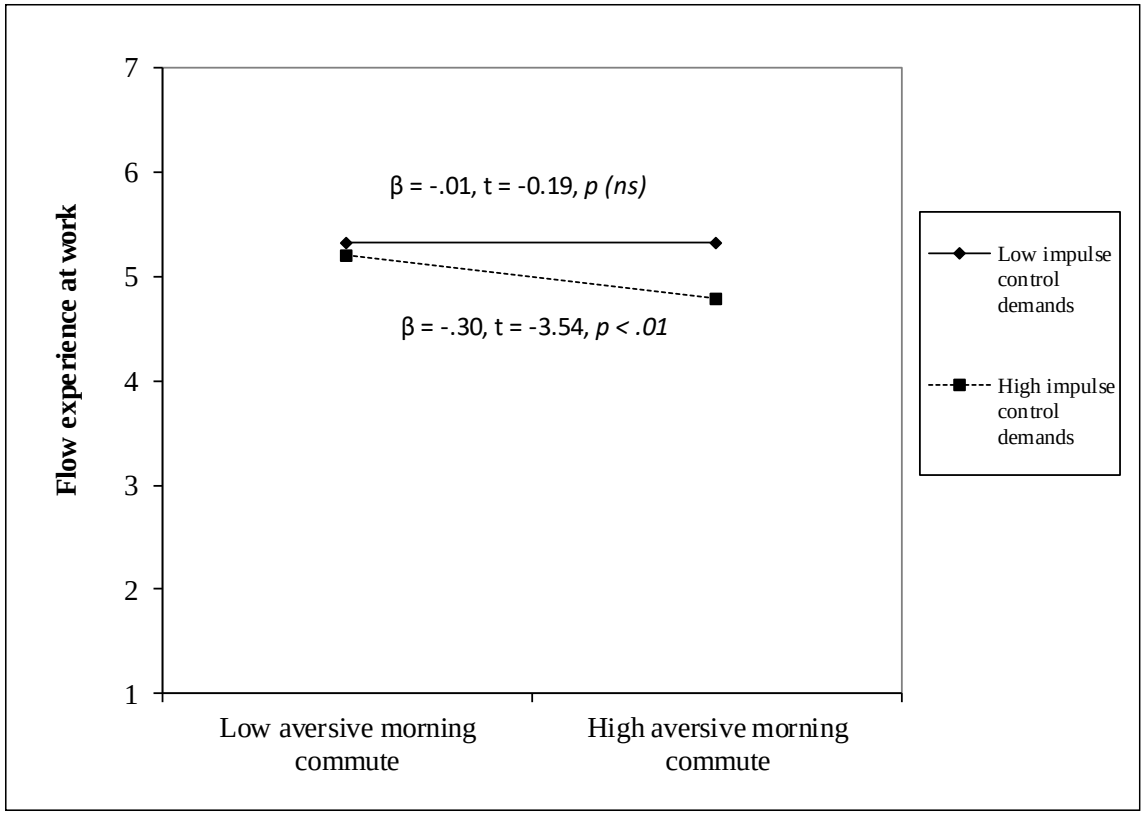
Note. SE = standard error; *LLCI* = lower-level confidence interval (95%); *ULCI* = upper-level confidence interval (95%); Confidence intervals are calculated using the Monte Carlo method for assessing mediation (MacKinnon et al., 2004); Confidence intervals which do not include zero are depicted in bold.

Figure 1. *Conceptual Model*



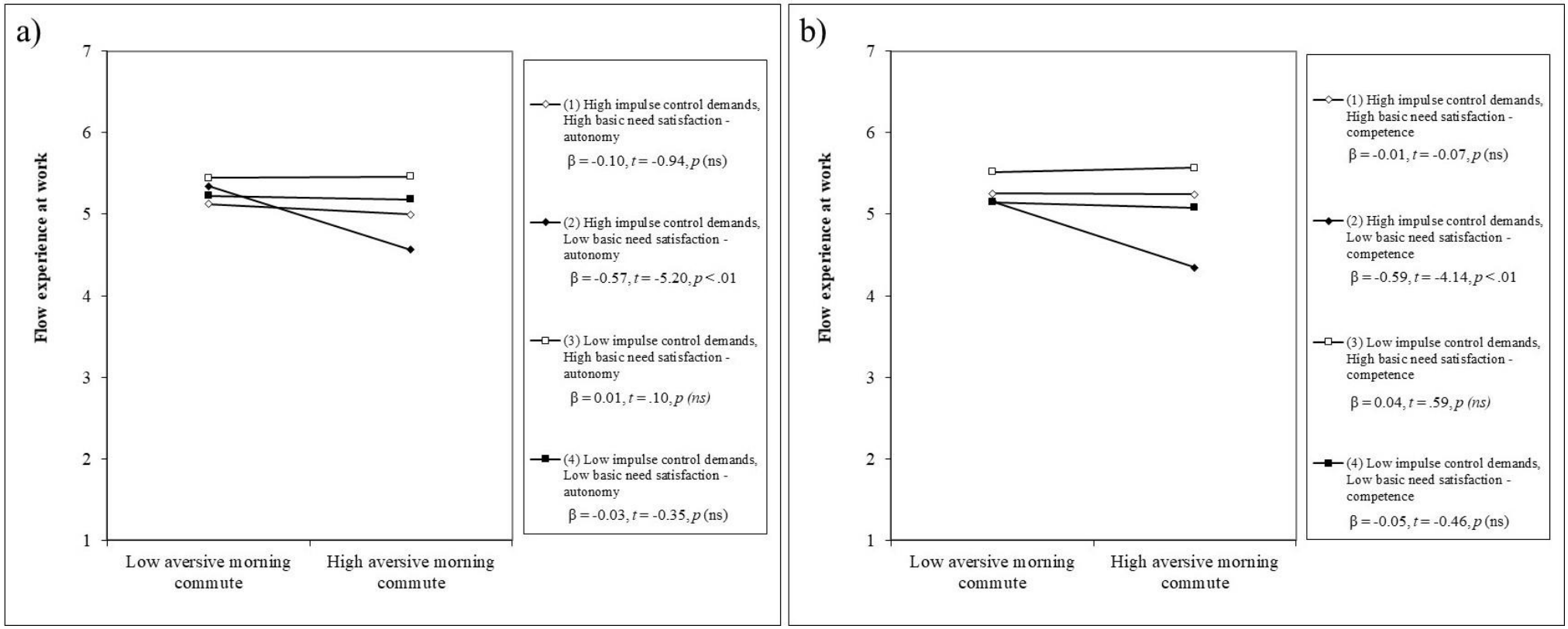
Note. Dashed lines depict indirect effects.

Figure 2. *Within-Person Interaction Effect of Aversive Morning Commute and Impulse Control Demands on Flow Experience at Work (Study 1).*



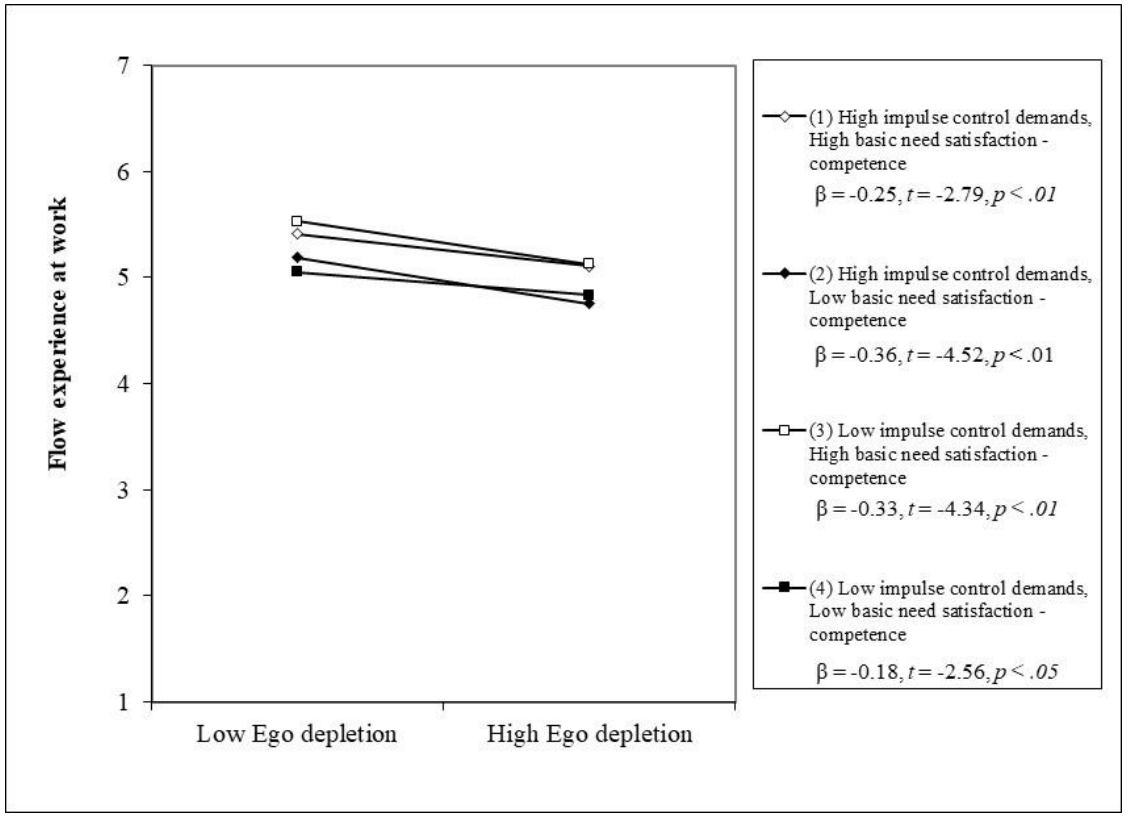
Note. The plot is based on the results of Model 1 and does not differ across all three models.

Figure 3. *Cross-Level Three-Way-Interaction Effects of Aversive Morning Commute, Impulse Control Demands, and Basic Need Satisfaction for (a) Autonomy and (b) Competence on Flow Experience (Study 1)*



Note. For the three-way interaction involving autonomy need satisfaction (a) plots are based on the results of Model 2 and for the three-way interaction involving competence need satisfaction (b) plots are based on the results of Model 1.

Figure 4. *Within-Person Three-Way-Interaction Effect of Ego Depletion, Impulse Control Demands, and Basic Need Satisfaction - Competence on Flow Experience (Study 2)*



Note. The plot is based on the results of Model 2.