Reciprocal Relationships Between Daily Emotion Regulation Strategies and Basic Need Satisfaction and Frustration: A Dynamic SEM Approach

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Abstract

Previous cross-sectional research has shown that individuals' emotion regulation styles differentially predict their experiences of basic psychological need satisfaction and frustration. Drawing on self-determination theory (SDT; Ryan & Deci, 2017), this daily diary study employed dynamic structural equation modelling (DSEM) to investigate the potential reciprocal and day-to-day spillover effects of emotional integration and suppression on daily autonomy, relatedness, and competence need satisfaction and frustration. Participants were 154 undergraduate students (59% female, Mage=23.70, SD=2.25). Using a daily diary methodology, participants completed online questionnaires assessing their emotion regulation styles and experiences of basic need satisfaction and frustration across 10 days. DSEM results showed emotional integration and the satisfaction of autonomy and competence needs were reciprocally related, whereas emotional integration predicted, but was not predicted by, relatedness satisfaction. A similar reciprocal relation emerged between emotional suppression and need frustration. Specifically, emotional integration on the previous day positively predicted satisfaction of all three basic needs (autonomy, relatedness, competence) the following day. Conversely, only autonomy and competence need satisfaction on the previous day positively predicted emotional integration the next day. Emotional suppression on the previous day positively predicted frustration of all three basic needs the following day, and vice versa. These findings enhance understanding of the bidirectional interplay between emotion regulation strategies and basic need experiences, shedding light on how these processes unfold in daily life and illustrating patterns consistent with eudaimonic functioning.

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1 Introduction

According to self-determination theory (SDT; Ryan & Deci, 2017), the satisfaction of the basic psychological needs for autonomy, competence, and relatedness is essential for well-being, whereas their frustration impedes growth and contributes to ill-being (Deci & Ryan, 2000). SDT adopts a eudaimonic view of wellness, defining well-being as living authentically, cultivating personal growth, and engaging in meaningful, purpose-driven activities (Martela, 2023; Ryan et al., 2006). Accordingly, basic need satisfaction represents a core component of eudaimonic functioning, while need frustration reflects defensive, non-eudaimonic modes of functioning (Martela, 2023; Vansteenkiste et al., 2020).

In recent years, research has extended SDT to the study of emotion regulation, emphasizing its central role in promoting or undermining basic need saitsfaction and frustration (Roth & Benita, 2023). According to this framework, emotion regulation strategies differ in the extent to which they foster openness and psychological integration versus avoidance and control, and these distinct emotion regulation strageies are differetially associated with basic satisfaction and frustration (Benita, 2020; Brenning et al., 2022; Formosa et al., 2024; Van Der Kaap-Deeder et al., 2021).

Despite these advances, most prior studies were cross-sectional and relied on global self-reports, limiting insight into how emotion regulation and need experiences fluctuate and influence one another in daily life. To address this gap, the present study employed a daily diary design and applied dynamic structural equation modeling (DSEM; Hamaker et al., 2018; McNeish & Hamaker, 2020) to examine same-day (concurrent) associations and day-to-day (lagged) spillover effects between emotion regulation strategies, as defined by SDT, and frustration of autonomy, relatedness, and competence needs. By capturing these processes as they naturally vary within and across days, we aimed to clarify how emotion regulation and need-based experiences dynamically co-occur and potentially reinforce one another in everyday life.

1.1 Basic Need Satisfaction and Frustration

Over recent decades, SDT (Ryan & Deci, 2017) has emerged as a leading framework for elucidating the processes through which individuals achieve their innate potential for growth and development. As noted above, in SDT's eudaimonic view of wellness, full psychological functioning is seen as a process in which people's behaviors fulfill their basic psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2008; Martela, 2023). Autonomy refers to the need to choose one's own life direction and to experience a sense of psychological freedom in one's behavior; relatedness refers to the need to develop intimate and close relation with others and to feel part of a group; competence refers to the need to reach one's goals and to effectively carry out one's daily activities (Vansteenkiste et al., 2020).

These three needs, both alone and combined, appear to be essential for well-being across ages, contexts, and cultures (Vansteenkiste et al., 2020). Numerous studies indicate the satisfaction of needs is positively associated with well-being (Chen et al., 2015; Church et al., 2013; Collie et al., 2016; Cordeiro et al., 2016; DeHaan et al., 2016; Martela & Ryan, 2016) and with various developmental outcomes, including pro-social tendencies (Wray-Lake et al., 2019), identity consolidation (Luyckx et al., 2009), and political engagement (Wüttke,

2020). In contrast, experiences of need frustration are robust predictors of a variety of ill-being indicators, including stress (Campbell et al., 2017), depressive symptoms (Cordeiro et al., 2016), anxiety (Ng et al., 2012), and psychopathology (e.g., Bartholomew et al., 2011; Chen et al., 2015; Cordeiro et al., 2016). These effects have been found in various life domains, such as work (Trépanier et al., 2016), education (e.g., Jang et al., 2016), and romantic relations (e.g., Kindt et al., 2017; Vanhee et al., 2016).

In SDT's eudaimonic activity model (Martela, 2023), the satisfaction or frustration of basic needs typically functions as an outcome of various socio-environmental influences, motivations, activities, and well-being or ill-being. Certain psychological and behavioral processes serve as indicators of eudaimonic activities and therefore promote need satisfaction, while others predict need frustration. Recent studies have found individuals' emotion regulatory processes, as a specific form of behavioral regulation, play an essential role in predicting need satisfaction or frustration (Benita et al., 2020; Emery et al., 2015).

1.2 Emotional Integration and Emotional Suppression as Antecedents of Basic Need Satisfaction and Frustration

Emotion regulation is defined as the process by which individuals influence their emotions, including when they experience them and how they express them (Gross, 1998). Several theoretical frameworks have sought to delineate the characteristics of adaptive emotion regulation (e.g., Bonanno & Burton, 2013; Gratz & Roemer, 2004; Gross, 2015), and recent research grounded in SDT has contributed to this effort (Benita, 2020; Roth & Benita, 2023; Roth et al., 2019). The uniqueness of the latter approach is its reliance on the eudaimonic view of well-being (Martela, 2023; Ryan et al., 2006). As such, it is intertwined with the concept of basic need satisfaction. According to the eudaimonic perspective, emotions are neither inherently positive nor negative; rather, they are an integral part of the organismic nature of individuals, playing a crucial role by informing individuals about their state within their environment. Attending to emotions non-defensively is thus considered a hallmark of unified self-functioning, a characteristic of eudaimonic activities.

Therefore, when evaluating the adaptiveness of emotion regulation processes, SDT considers whether individuals regulate their emotions in a manner that allows them to be fully open to their experiences and utilize their emotions to facilitate psychological growth or disengage from their emotional experiences in a way that compartmentalizes their experiences, hindering psychological growth (Benita, 2020; Roth & Benita, 2023; Roth et al., 2019). Specifically, SDT differentiates emotion regulation strategies supporting this growth process from those undermining it: *emotional integration* involves a differentiated awareness of emotions and intentional exploration of emotions as they arise, while *emotional suppression* involves efforts to conceal or ignore emotions.

As might be expected, emotional integration has been shown to be a positive predictor of the experience of basic need satisfaction across cultures and contexts (Benita et al., 2020; Brenning et al., 2022; Formosa et al., 2024). Researchers have substantiated this connection by examining relations between emotional integration and proxy variables of basic need satisfaction. For instance, Benita et al. (2023) showed emotional integration is associated with autonomous goal pursuit processes, whereby individuals who use emotional integration pursue goals volitionally (i.e., autonomy satisfaction). Other studies have shown emotional integration can help individuals use the informational value of emotions to manage

significant events (Roth et al., 2014, 2018) and achieve goals, (Benita et al., 2021, 2023, 2024), i.e., competence satisfaction. Furthermore, it facilitates open communication about emotionally charged topics with close others (Roth & Assor, 2012) and predicts empathy and prosocial behaviors (Benita et al., 2017), i.e., relatedness satisfaction. Importantly, the negative relation between emotional integration and basic need frustration has received only partial support, as this association has been significant in some samples but non-significant in others (see Benita et al., 2020; Brenning et al., 2022; Van Der Kaap-Deeder et al., 2021).

Emotional suppression has consistently been identified as a predictor of basic need frustration (Benita et al., 2020; Brenning et al., 2022; Van Der Kaap-Deeder et al., 2021), an association supported by studies examining relations between emotional suppression and proxy variables of basic need frustration. For instance, Benita et al. (2023) found emotional suppression plays a role in controlled goal pursuit processes. Specifically, individuals tend to use emotional suppression for goals they feel alienated from and endorse to please others (autonomy frustration). Additionally, emotional suppression is often maladaptive, as it impairs effective coping with emotions and hinders goal pursuit (Benita et al., 2021, 2023; Roth et al., 2014), leading to competence frustration. Finally, this strategy likely carries an interpersonal cost, as the secrecy associated with emotional suppression inhibits open communication with others, resulting in relatedness frustration (Low et al., 2017; Roth & Assor, 2012). Similar to emotional integration, the negative relation between emotional suppression and basic need satisfaction has received only partial support, as this association has been significant in some samples but non-significant in others (see Benita et al., 2020; Brenning et al., 2022; Formosa et al., 2024).

Despite these insights, studies linking emotional integration and suppression to need satisfaction and frustration have several significant limitations. First, they often treat basic need satisfaction or frustration as an omnibus measure, without distinguishing between the specific needs for autonomy, competence, and relatedness. This is important: while these needs are closely related, they function independently, complement one another, and are not compensatory (Vansteenkiste et al., 2020). Thus, although evidence using proxy variables of the basic needs supports the hypothesized relations between emotion regulation strategies and basic need satisfaction or frustration, it is essential to investigate whether these strategies are more strongly associated with certain needs than others.

Second, previous studies used cross-sectional designs and evaluated the variables as global trait-like constructs. This method fails to capture the dynamic and fluctuating interrelations between emotional regulation and need satisfaction or frustration. To bridge this gap, the current research employed a daily diary methodology.

1.3 A Dynamic Approach to Study Daily Emotion Regulation Strategies and Basic Need Satisfaction and Frustration

An individual's emotion regulation strategies and experiences of basic need satisfaction and frustration are dynamic and can vary from day to day. Variations in emotion regulation strategy use can be the result of different situational affordances, such as the intensity and type of emotionally arousing event (e.g., Benita et al., 2024; Blanke et al., 2020; Erbas et al., 2022; Medland et al., 2020). Similarly, experiences of basic need satisfaction are contingent upon daily variations in certain behavioral regulations and experiences (Aldrup et al., 2017; Foulk et al., 2019). Thus, the relations between the variables may be dynamic and fluctuate

from day to day. As previously mentioned (e.g., Benita et al., 2020; Brenning et al., 2022; Formosa et al., 2024), existing studies examining the relations between emotion regulation processes and basic need satisfaction and frustration have used global self-reports and cross-sectional designs and thus cannot account for their dynamic relations.

Importantly, as proposed by the eudaimonic activity model (e.g., Martela, 2023) and demonstrated in previous studies using a global measurement approach (e.g., Benita et al., 2020; Brenning et al., 2022; Formosa et al., 2024), emotion regulation strategies serve as predictors of basic need satisfaction or frustration. However, adopting a dynamic perspective may reveal a more nuanced pattern, as these relations could be bidirectional and reciprocal. For example, while emotional integration may facilitate experiences of need satisfaction, these experiences, in turn, may promote continued emotional exploration. The experience of basic need satisfaction is inherently energizing and self-gratifying (e.g., Foulk et al., 2019), so it may enable individuals to maintain their tendency to actively engage with their emotions. Thus, the combination of emotional integration and basic need satisfaction may create an upward spiral. Conversely, emotional suppression may predict basic need frustration, and experiences of basic need frustration may deplete energy and be accompanied by feelings of shame and doubt. This may discourage individuals from engaging in their emotions, leading them to continue suppressing their emotions and creating a downward spiral.

In this study, we were particularly interested in examining these relations as they unfold across days, focusing on potential spillover effects. We proposed the reciprocal effects of emotion regulation strategies and basic need satisfaction/frustration may extend beyond a single day. Thus, to the extent to which there is an upward or downward spiral, it will be reflected in the way emotional integration or suppression and basic need satisfaction or frustration reciprocally influence each other across days, shaping a eudaimonic (vs. non-eudaimonic) way of living.

1.4 The Present Investigation

In this daily diary study, we used a DSEM (Asparouhov et al., 2017; Asparouhov & Muthén, 2020) approach to examine potential reciprocal relations between daily emotional integration/suppression and basic need satisfaction/frustration across days. Unlike previous cross-sectional studies, this dynamic approach can provide insight into the dynamic interplay between emotion regulation strategies and basic need satisfaction or frustration by obtaining intensive, repeated self-reports in everyday life. Second, it allows the examination of events and experiences, such as the satisfaction of basic psychological needs, in their natural, spontaneous context (Bolger et al., 2003). Third, it enables researchers to decompose daily variations in self-reports into within-person and between-person variance, thereby capturing both fluctuating and stable characteristics of the explored variables (Hamaker & Wichers, 2017; Koval et al., 2023). Finally, it allows researchers to examine potential spillover effects that may occur within the same day or across days.

The conceptual model of the study is presented in Fig. 1. As the figure shows, we tested our hypotheses at the within-person level, examining daily concurrent, autoregressive, and cross-lagged effects. These effects were modeled both within the same day (concurrent effects) and across days (spillover effects). Spillover effects were determined by the relations between previous-day (t-1) and same-day (t) variables.
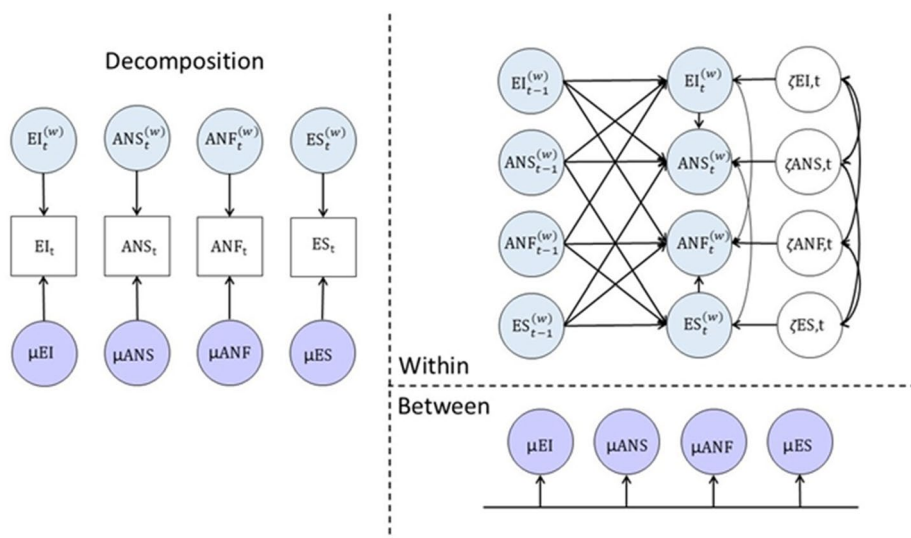
Fig. 1 Representation of the Multilevel VAR(1) Model. *Note* Left part contains the decomposition into within-person (time-varying) and between-person (time-invariant) components. The top-right part illustrates autoregressive, cross-lagged, and concurrent paths estimated from daily data; w=within-person, t=current day (same-day/concurrent effects), t–1=previous day (day-to-day/lagged spillover effects). The bottom-right part includes the random intercepts (e.g., μEI, μANS, μANF, μES). EI=emotional integration; ES=emotional suppression; ANS=autonomy satisfaction, ANF=autonomy frustration

The use of autoregressive parameters captured the relations between variables (emotional integration/suppression and basic need satisfaction/frustration) on the previous day and on the same day. We expected all autoregressive effects would be positive.

We first examined same-day (concurrent) associations between emotion regulation strategies and basic psychological need experiences. Because these measures were collected once per day, we could not establish temporal direction within the same day. Therefore, the hypotheses were based on prior theoretical and empirical work suggesting emotion regulation strategies are associated with daily need satisfaction and frustration.

H1a: Emotional integration will be positively associated with same-day autonomy, relatedness, and competence need satisfaction.

H1b: Emotional suppression will be positively associated with same-day autonomy, relatedness, and competence need frustration.

Our main hypotheses centered on reciprocal effects, so we examined day-to-day effects. We expected emotional integration and suppression would be reciprocally related with basic need satisfaction and frustration, respectively, across days:

H2a: Previous-day emotional integration will be positively and bidirectionally linked with next-day autonomy, relatedness, and competence need satisfaction.

H2b: Previous-day emotional suppression will be negatively and bidirectionally linked with next-day autonomy, relatedness, and competence need satisfaction.

Although our primary focus was on the theoretically congruent associations – positive links between emotional integration and need satisfaction, and between emotional suppression and need frustration – as demonstrated in previous studies (Benita et al., 2020; Brenning et al., 2022; Formosa et al., 2024; Van der Kaap-Deeder et al., 2021), we also examined the cross-pattern associations (i.e., negative links between emotional integration and need frustration, and between emotional suppression and need satisfaction) to provide a more comprehensive account of these daily dynamics. Because prior research has yielded only partial support for such cross-pattern associations, this part of the analysis was exploratory in nature. In addition, although we examined each basic need separately rather than using a composite score, because previous studies have not shown a specific tendency for emotional integration or suppression to be associated with particular basic needs, we did not create hypotheses for individual needs.

1.5 Statement of Transparency

This study was part of a larger study assessing college students' academic goal pursuit. Findings using this dataset have been previously reported by [Author]. Measures related to goal pursuit were not used in the present study. This research addressed different research questions. All study materials (including all measures from the larger study) and statistical outputs are available on the open science framework (project link: https://osf.io/x6yvh/?view_only=b906d6071e324659bbf6fcd44429b530).

2 Method

2.1 Participants and Procedure

Participants ($N = 154$, 59% female, Mage $= 23.70$, SD $= 2.25$) were university students from [country] Israel recruited via online advertisements. Of these 98.1% were undergraduates (the rest were in a Master's program), and 86% were studying engineering (the rest were in computer science, pharmacy, and economics and accounting). Sensitivity analysis indicated our sample was sufficient to detect a Level 2 small effect of 0.04 (Cohen, 1992). Although statistical power is typically lower for within-person effects in daily diary studies, previous simulation work indicates that similar designs (e.g., 100–150 participants with 8–10 daily assessments) provide adequate power (> 0.80) to detect small-to-moderate within-person effects in DSEM models (Hamaker et al., 2018; McNeish & Hamaker, 2020). Given our sample size ($N = 154$) and the high compliance rate across 10 days (M $= 9.1$ days completed; 91%), our design provides sufficient sensitivity to detect the within-person associations of interest. Nonetheless, power to detect very small within-person effects may have been limited, and this should be considered when interpreting nonsignificant results.

Participants completed online questionnaires using Qualtrics. On day 1, they completed general surveys, one of which was a demographic questionnaire collecting data on age, gender, and degree. In addition, we asked participants about their employment status, as it

is common for students in [country] Israel to hold part-time jobs. Importantly, employment status was unrelated to any of the study variables, so we did not include it as a covariate in our analyses. Over the next 10 days, participants received daily links at noon along with a questionnaire to be completed during the day. If they did not complete the questionnaire by 6 pm, they received a reminder email. This timing was chosen to ensure they filled out the questionnaire as close in time as possible to their emotional daily life experience to reduce recall biases. On average, participants completed the daily surveys at 6:30 pm, with completion times ranging from 12:00 pm to 2:30 am the following day. Because the timing of measurement could potentially influence the study variables, we examined whether survey completion time was associated with any of them at the within-participant level and whether it should be included as a covariate in the model. Completion time was unrelated to all study variables; therefore, we did not include it as a covariate. The Mplus file containing the analyses examining associations with completion time is in the online supplement on the OSF. Participants were paid the equivalent of US$50 upon completing all 10 daily surveys. In cases of partial completion, participants were paid proportionally to the number of days they completed.

At baseline, 175 students completed the assessment, and 154 completed at least one daily report and were therefore included in the study. Participants completed an average of 7.5 of the 10 daily surveys (SD=2.1): 81 participants (52.6%) completed all 10 days, 17 (11%) completed 9 days, seven (4.5%) completed 8 days, six (3.9%) completed 7 days, two (1.6%) completed 6 days, one (0.6%) completed 5 days, five (3.2%) completed 4 days, four (2.6%) completed 3 days, eight (5.2%) completed 2 days, and 23 (14.9%) completed 1 day.

We included all participants in our analysis, as the multilevel DSEM framework appropriately weights each participant's contribution according to the number of available data points, thereby balancing missing data and minimizing bias (Raudenbush & Bryk, 2002). Although approximately 20% of participants completed three or fewer diary entries, this analytic approach allows individuals with fewer observations to contribute to the estimation of between-person means and variances, even when they provide limited information for within-person effects. In addition, although participants who completed only one diary entry cannot contribute to the estimation of day-to-day (time-varying) effects, they can still inform the estimation of concurrent (same-day) means and variances within the DSEM framework. Because DSEM automatically weights each participant's contribution according to the number of available data points, single-day participants contribute minimally to within-person effects and thus are unlikely to bias the findings. For this reason, we retained these participants in the analyses.

Missing data were handled using Bayesian estimation. In this approach, missing values are treated as parameters and sampled from their conditional posterior at each iteration of the Markov chain Monte Carlo (MCMC) algorithm, which accounts for the autocorrelated structure of individual data (Hamaker et al., 2018; McNeish & Hamaker, 2020). All study procedures were approved by the Human Subjects Research Committee at [university] (Request Number: 2420).

2.2 Measures

All questionnaires were administered in [language] Hebrew, the language of instruction at the university. Responses were on a 5-point scale from 1 (strongly disagree) to 5 (strongly

agree). Items for each scale were presented in a mixed order. Reliability estimates for within- and between-participant levels were calculated following Lai (2021). In this approach, three reliability estimates are calculated: a raw estimate based on observed scores and two latent estimates for within-person and between-person reliability. Cronbach's α was calculated for the remaining daily scales (two items). Table 4 presents the descriptive statistics and reliability of our measures.

2.2.1 Daily Diary Measures

Emotional Integration and Suppression As per Benita et al. (2023), five items assessed the degree to which participants tried to take an interest in their emotions (emotional integration) or to control and or hide their negative emotions (emotional suppression) when faced with challenges and setbacks on that day; this procedure was repeated across 10 consecutive days. Each item began: 'Today, when I felt negative emotions I…'. The emotional integration scale included two items, for example, 'I tried to understand why I feel this way'. The emotional suppression scale included three items, for example, 'I tried to hide my thoughts and feelings from people around me'.

   Basic Need Satisfaction and Frustration We used a version of the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015) previously adapted for daily use by van der Kaap-Deeder et al. (2017). Twelve items assessed the degree to which participants reported the satisfaction of their three basic psychological needs (autonomy, competence, relatedness) for that day; this procedure was repeated across 10 consecutive days. Each basic need subscale consisted of four items, with two items assessing need satisfaction, and two assessing need frustration, for example: autonomy satisfaction: 'Today I felt that my decisions reflect what I really want'; autonomy frustration: 'Today I felt pressured to do too many things'; relatedness satisfaction: 'Today I felt connected with people who care about me and whom I care about'; relatedness frustration: 'Today I felt that people who matter to me are far from me'; competence satisfaction: 'Today I felt capable at what I did'; competence frustration: 'Today I felt disappointment with most of my performance'.

2.3 Analytic Strategy

The structure of our data, in which daily observations were nested within participants, required a multilevel modeling approach (Huang, 2016; McNeish & Stapleton, 2016). We first calculated intraclass correlations (ICCs) for the variables included in the model (emotional integration and suppression; autonomy, competence, and relatedness need satisfaction and frustration). The ICC represents the proportion of total variance attributable to differences between participants (Gavin & Hofmann, 2002). As shown in Table 1, all ICCs exceeded 0.50, indicating a substantial portion of the variance reflected stable between-person differences, yet a meaningful proportion of variance also remained within persons across days. This pattern supports the use of a multilevel framework capable of modeling both sources of variance. Accordingly, we employed DSEM to simultaneously estimate the stable between-person structure and the fluctuating within-person dynamics of emotional integration, emotional suppression, and basic psychological need satisfaction and frustration.

Table 1 Descriptive Statistics, Reliabilities, and intraclass correlations

Variable	M	SD	Skewness	Kurtosis	α/ωraw	α/ωwithin	α/ωbetween	ICC
Emotional integration	2.49	1.10	0.28	−0.78	0.83	0.61	0.92	0.61
Emotional suppression	2.34	1.00	0.43	−0.31	0.60	0.57	0.58	0.70
Autonomy satisfaction	3.20	0.92	0.10	−0.34	0.78	0.50	0.87	0.64
Relatedness satisfaction	4.10	0.76	−0.55	−0.22	0.79	0.54	0.90	0.57
Competence satisfaction	3.38	0.82	−0.09	0.11	0.84	0.65	0.91	0.55
Autonomy frustration	2.87	0.98	−0.10	−0.54	0.70	0.42	0.79	0.67
Relatedness frustration	1.79	0.85	1.00	0.44	0.74	0.50	0.84	0.62
Competence frustration	2.70	1.00	0.04	−0.60	0.80	0.60	0.89	0.57

For scales comprising two items (daily emotional integration, daily autonomy, relatedness and competence satisfaction/ frustration), reliability estimates are Cronbach's α. For scales comprising more than two items (daily emotional suppression), reliability estimates are ωs. Abbreviations: ICC = intraclass correlations

Next, we examined correlations between the study variables, exploring whether each predicting variable was related to its outcome. We examined correlations for both within- and between-participant variance using the multilevel structural equation modeling (MSEM) framework (Muthén & Muthén, 2012). Based on the obtained correlations and to examine our hypothesized model (Fig. 1), we continued to our DSEM analyses.

Multilevel DSEM was developed from multilevel modeling and time-series modeling methods, so it can estimate autoregressive and cross-lagged and structural relations between random variables (Asparouhov et al., 2018; McNeish & Hamaker, 2020). Researchers can treat any random parameter as a predictor or outcome and estimate correlations between parameters. It also enables decomposing the data into a within-person part and a between-person part and modeling each of these parts with its own model.

We used a DSEM Model 1 – a multilevel vector autoregressive model (ML-VAR(1)) – in which each variable on the previous day (t–1) predicted the corresponding or related variable on the following day (t) (McNeish & Hamaker, 2020). We estimated lagged (day-to-day) and concurrent (same-day) associations across up to 10 consecutive observations per participant. We estimated three separate models, one for each pair of basic psychological need satisfaction and frustration variables: autonomy, relatedness, and competence.

Figure 1 illustrates our ML-VAR(1) for autonomy need satisfaction and frustration. The left part of the figure presents the decomposition of the total variance into two portions: between- and within-person. The decomposition into the within-person and between-person parts is:

$$EI_{it} = \mu EI_i + EI_{it}^{(w)}, ANS_{it} = \mu ANSi + ANS_{it}^{(w)},$$
$$ANF_{it} = \mu ANFi + ANF_{it}^{(w)} \text{ and } ES_{it} = \mu ESi + ES_{it}^{(w)}$$

where the μs are the within-person means forming the between-person part of the model, and $EI_{it}^{(w)}$, for example, represents the temporal deviations of individual i at occasion t from these within-person means (Hamaker et al., 2018).

The top right part of Fig. 1 contains the within-person model. The model includes four autoregressive, eight cross-lagged, and four concurrent effect paths. All within-person autoregressive and cross-lagged slopes were estimated as fixed effects (i.e., constrained to be equal across participants), consistent with our focus on group-level daily dynamics

rather than individual differences in these parameters. This specification aligns with SDT's assumption that basic need processes operate similarly across individuals and avoids estimation instability associated with random slopes in short time series (10 days per person) in DSEM (Hamaker et al., 2018; McNeish & Hamaker, 2020).

Hence, in this model, t=same-day (the current time point) and t-1=previous-day (previous time point). The first autoregressive effect represents the autoregression of daily emotional integration ($EI^{(w)}_{t-1} \rightarrow EI^{(w)}_t$). The second represents the autoregression of autonomy need satisfaction ($ANS^{(w)}_{t-1} \rightarrow ANS^{(w)}_t$). The third represents the autoregression of autonomy need frustration ($ANF^{(w)}_{t-1} \rightarrow ANF^{(w)}_t$). The fourth represents the autoregression of daily emotional suppression ($ES^{(w)}_{t-1} \rightarrow ES^{(w)}_t$).

Cross-lagged paths use two or more variables measured simultaneously across several occasions to model cross-lagged associations and thus can help determine whether one variable predicts the other (Schuurman et al., 2016). The first cross-lagged path shown in Fig. 1 uses emotional integration on the previous day to predict current day autonomy need satisfaction ($EI^{(w)}_{t-1} \rightarrow ANS^{(w)}_t$). The second uses autonomy need satisfaction on the previous day to predict current day emotional integration ($ANS^{(w)}_{t-1} \rightarrow EI^{(w)}_t$). The third uses emotional integration on the previous day to predict current day autonomy need frustration ($EI^{(w)}_{t-1} \rightarrow ANF^{(w)}_t$). The fourth uses autonomy need frustration on the previous day to predict current day emotional integration ($ANF^{(w)}_{t-1} \rightarrow EI^{(w)}_t$). The fifth uses emotional suppression on the previous day to predict current day autonomy need satisfaction ($ES^{(w)}_{t-1} \rightarrow ANS^{(w)}_t$). The sixth uses autonomy need satisfaction on the previous day to predict current day emotional suppression ($ANS^{(w)}_{t-1} \rightarrow ES^{(w)}_t$). The seventh uses emotional suppression on the previous day to predict current day autonomy need frustration ($ES^{(w)}_{t-1} \rightarrow ANF^{(w)}_t$). The eighth uses autonomy need frustration on the previous day to predict current day emotional suppression ($ANF^{(w)}_{t-1} \rightarrow ES^{(w)}_t$).

In the first concurrent path, emotional integration is modeled as a predictor of same-day autonomy need satisfaction ($EI^{(w)}_t \rightarrow ANS^{(w)}_t$). In the second, emotional integration is modeled as a predictor of same-day autonomy need frustration ($EI^{(w)}_t \rightarrow ANF^{(w)}_t$). In the third, emotional suppression is modeled as a predictor of same-day autonomy need satisfaction ($ES^{(w)}_t \rightarrow ANS^{(w)}_t$). In the fourth, emotional suppression is modeled as a predictor of same-day autonomy need frustration ($ES^{(w)}_t \rightarrow ANF^{(w)}_t$).

Finally, the four white circles in Fig. 1 represent the residuals of the variables at the within-participant level. The lower right circle contains the random means of the between-participant levels (e.g., μEI, μANS, μANF, and μES).

2.3.1 Model Estimator

DSEM uses the Bayesian estimator and treats residuals and autocorrelations as latent variables. Bayesian estimation is based on combining the likelihood of the data with prior distributions for the unknown model parameters to obtain posterior distributions for these unknown parameters (Gelman et al., 2014; Lynch, 2007). Estimation typically consists of an iterative process in which parameters are sampled from conditional distributions according to an MCMC procedure (Gelman et al., 2014). When using an MCMC algorithm to estimate parameters, it is necessary to decide on the number of iterations. We used three tools to evaluate the Bayesian models and check convergence: posterior scale reduction (PSR), autocorrelation plots, and trace plots. Prior research contains detailed discussions of these tools (Depaoli & Van de Schoot, 2017; Zyphur & Oswald, 2015).

PSR evaluates the proportional variance between and within the two Markov chains. PSR values decrease with additional iterations and should approach 1 for converging models. In our models, PSR values reached 1.00, indicating satisfactory convergence. To further ensure model stability, we increased the number of MCMC iterations from the initial 2,000 to 8,000. Thinning was applied selectively (interval = 10) for parameters exhibiting higher posterior autocorrelation, as indicated by their autocorrelation plots. Convergence was verified through the PSR criterion and visual inspection of trace plots; the substantive results remained unchanged across runs, supporting model robustness.

Posterior autocorrelation refers to the correlation between MCMC sample values for a given parameter that are a certain number of steps apart. It measures the dependence of consecutive samples within the MCMC process. If autocorrelation tends to decline as the interval increases, the thinning technique should be used (Muthén, 2010). In our case, the autocorrelation plots of parameters showed no evidence of high autocorrelations for most parameters (e.g., autocorrelations were smaller than 0.1; Muthén, 2010). For a few parameters, the plots showed a tendency for autocorrelations to be smaller as intervals increased; therefore, thinning was applied. The thinning interval was 10 (similar to the following models).

Trace plots visually display MCMC samples over iterations, with a well-mixed, stable, and overlapping pattern across chains indicating good convergence. Our trace plots showed our models converged quickly and mixed well.

Finally, Bayesian estimation produced posterior medians and 95% credible intervals (CrIs). Parameters whose CrI did not include zero were interpreted as credibly different from zero (i.e., statistically meaningful). The models were estimated with two Markov chains and 2,000 iterations; in some cases, thinning (interval = 10) was applied to reduce autocorrelation in the posterior samples. To test model stability, iterations were increased to 8,000, and the results remained unchanged. For transparency, we also report Bayesian posterior p-values, which indicate the probability of an effect in a given direction but are not equivalent to frequentist significance tests (McNeish & Hamaker, 2020; McNeish et al., 2024). Because all parameters showed a similar pattern in the autocorrelations and trace plots, we included representative examples in the Online Supplement. All three models converged well.

3 Results

3.1 Correlations Among Variables

Table 1 presents the descriptive statistics and reliability estimates for all study variables. As shown, raw and between-person reliabilities were satisfactory, but within-person reliabilities were relatively low.

Table 2 shows the correlations between the study variables at the within-participant and between-participant levels. The correlations provided preliminary support for the hypotheses. At the within-person level, daily emotional integration was positively correlated with daily autonomy and competence need satisfaction and positively correlated with daily emotional suppression. Daily emotional suppression was positively correlated with daily autonomy, competence, and relatedness need frustration and negatively correlated with daily relatedness need satisfaction. All three measures of daily basic need satisfaction and frustration were significantly related and in the expected direction. At the between-person level, daily emotional integration was positively correlated with daily autonomy and competence need satisfaction and positively correlated with daily emotional suppression and daily relatedness need frustration. Daily emotional suppression was positively correlated with daily autonomy, competence, and relatedness need frustration. Additionally, daily emotional suppression was negatively correlated with daily autonomy, competence, and relatedness need satisfaction. All three measures of daily basic need satisfaction and frustration were significantly related and in the expected direction.

3.2 DSEM

The DSEM analyses tested bidirectional relations between emotional integration/suppression and daily basic need satisfaction and frustration. In line with our hypotheses, we focused on the congruent associations – emotional integration with need satisfaction and

Table 2 Intercorrelations of study variables for between level (Below Diagonal) and within level (Above Diagonal)

Variable	1	2	3	4	5	6	7	8
1. Emotional integration	–	0.24**	0.10**	0.05	0.11**	0.05	−0.02	−0.03
2. Emotional suppression	0.26***	–	−0.03	−0.08**	0.01	0.16**	0.11**	0.09**
3. Autonomy satisfaction	0.09	−0.20*	–	0.16**	0.36**	−0.31**	−0.20**	−0.24**
4. Relatedness satisfaction	0.07	−0.38**	0.41**	–	0.24**	−0.01	−0.40**	−0.17**
5. Competence satisfaction	0.18*	−0.30**	0.67**	0.60**	–	−0.11**	−0.20**	−0.50**
6. Autonomy frustration	0.07	0.30**	−0.71**	−0.31**	−0.46**	–	0.09**	0.25**
7. Relatedness frustration	0.22*	0.42**	−0.25**	−0.65**	−0.35**	0.44**	–	0.22**
8. Competence frustration	0.13	0.43**	−0.55**	−0.41**	−0.76**	0.56**	0.52**	–

$**p < 0.01$

emotional suppression with need frustration. We examined the cross-pattern associations (integration with need frustration and suppression with need satisfaction) on an exploratory basis to provide a comprehensive picture of the daily dynamics.

3.2.1 Daily Autonomy Need Satisfaction and Frustration

Table 3 presents the DSEM results testing bidirectional relations between emotional integration/suppression and autonomy need satisfaction/frustration. As expected, significant autoregressive effects were found for all four variables (emotional integration, emotional suppression, autonomy need satisfaction, autonomy need frustration).

Table 3 Model results of dynamic structure equation models (ML-VAR) examining associations between emotion regulation and autonomy satisfaction and frustration

	Est.	Est. St.	p	95% CI	Est.	Est. St.	p	95% CI
Within participants								
Emotional integration(t-1) → Emotional integration(t)	0.31	0.05	**<0.001**	[0.22, 0.41]				
Emotional suppression(t-1) → Emotional suppression(t)	0.55	0.06	**<0.001**	[0.41, 0.65]				
	Autonomy satisfaction				**Autonomy frustration**			
Autonomy(t-1) → Autonomy(t)	0.44	0.04	**<0.001**	[0.35, 0.52]	0.27	0.05	**<0.001**	[0.18, 0.37]
Cross-Lagged Effects								
Emotional integration(t-1) → Autonomy(t)	0.07	0.03	**0.004**	[0.02, 0.13]	-0.05	0.03	0.058	[-0.11, 0.01]
Autonomy(t-1) → Emotional integration(t)	0.22	0.06	**<0.001**	[0.10, 0.34]	0.07	0.05	0.083	[-0.02, 0.18]
Emotional integration(t) → Autonomy(t)	0.14	0.03	**<0.001**	[0.10, 0.19]	-0.05	0.03	**0.036**	[-0.11, 0.00]
Emotional suppression(t-1) → Autonomy(t)	-0.12	0.04	**<0.001**	[-0.20, -0.05]	0.14	0.04	**<0.001**	[0.06, 0.22]
Autonomy(t-1) → Emotional suppression(t)	-0.20	0.04	**<0.001**	[-0.30, -0.10]	0.12	0.05	**0.005**	[0.03, 0.23]
Emotional suppression(t) → Autonomy(t)	-0.24	0.04	**<0.001**	[-0.33, -0.16]	0.36	0.05	**<0.001**	[0.28, 0.46]
Between participants								
Means								
Emotional integration(μ)	2.30	0.24	**<0.001**	[2.50, 3.45]				
Emotional suppression(μ)	2.27	0.11	**<0.001**	[2.03, 2.47]				
Autonomy(μ)	3.25	0.09	**<0.001**	[3.13, 3.43]	2.83	0.08	**<0.001**	[2.66, 2.98]

Est.= unstandardized estimates; Est. St.=estimates for fixed within effects are standardized using the STDYX Standardization in M*plus*. *p*=Bayesian equivalent to two-sided *p*-values. They are interpreted 'as the proportion of the posterior distribution on the opposite side of 0 than the posterior mean' (McNeish & Hamaker, 2020). Significant associations are indicated in bold. Abbreviations: ML-VAR, multilevel vector autoregressive model

Our first hypotheses focused on the concurrent effects. As expected by H1a and H1b, we found significant positive associations between emotional integration and autonomy need satisfaction and between emotional suppression and autonomy need frustration. In addition, there was a significant negative concurrent association between emotional suppression and autonomy need satisfaction.

Our next hypotheses focused on across-day effects. As predicted by H2a, we found significant reciprocal effects between emotional integration and autonomy need satisfaction. Individuals' emotional integration on a previous day positively predicted autonomy need satisfaction on the next day, and vice versa. In addition, as predicted by H2b, we found significant bidirectional cross-lagged associations in the expected direction between emotional suppression and autonomy need frustration. Individuals' emotional suppression on the previous day positively predicted their autonomy frustration on the next day, and vice versa. The cross-lagged associations between emotional integration and autonomy need frustration were non-significant, but there were significant cross-lagged associations in the expected direction between emotional suppression and autonomy need satisfaction. Individuals' emotional suppression on a previous day negatively predicted autonomy need satisfaction on the next day, and vice versa.

3.2.2 Daily Relatedness Need Satisfaction and Frustration

Table 4 presents the DSEM results for bidirectional relations between emotional integration/suppression and relatedness need satisfaction/frustration. As expected, significant autoregressive effects were found for all four variables (emotional integration, emotional suppression, relatedness need satisfaction, relatedness need frustration).

As expected by Hypotheses H1a and H1b, there were significant positive associations between emotional integration and relatedness need satisfaction and between emotional suppression and relatedness need frustration. In addition, significant negative concurrent associations were found between emotional integration and relatedness need frustration and between emotional suppression and relatedness need satisfaction.

H2a was not supported; there was no bidirectional relation between emotional integration and relatedness need satisfaction. Previous-day emotional integration positively predicted same-day relatedness need satisfaction, but previous-day relatedness need satisfaction did not predict same-day emotional integration. However, H2b was supported; significant cross-lagged associations in the expected direction were found between emotional suppression and relatedness need frustration. Specifically, emotional suppression on the previous day positively predicted relatedness need frustration on the next day, and vice versa, and emotional integration on the previous day negatively predicted relatedness need frustration on the next day, but not vice versa. Finally, significant negative cross-lagged associations were found between emotional suppression and relatedness need satisfaction, whereby emotional suppression on the previous day negatively predicted relatedness need satisfaction on the next day, and vice versa.

3.2.3 Daily Competence Need Satisfaction and Frustration

Table 5 presents the DSEM results for bidirectional relations between emotional integration/suppression and competence need satisfaction/frustration. As expected, significant autore-

Table 4 Model results of dynamic structure equation models (ML-VAR) examining associations between emotion regulation and relatedness satisfaction and frustration

	Est.	Est. St.	p	95% CI	Est.	Est. St.	p	95% CI
Within participants								
Emotional integration(t-1) → Emotional integration(t)	0.30	0.05	**<0.001**	[0.21, 0.40]				
Emotional suppression(t-1) → Emotional suppression(t)	0.55	0.05	**<0.001**	[0.44, 0.63]				
	Relatedness satisfaction				**Relatedness frustration**			
Relatedness(t-1) → Relatedness(t)	0.25	0.04	**<0.001**	[0.16, 0.33]	0.37	0.04	**<0.001**	[0.28, 0.45]
Cross-Lagged Effects								
Emotional integration(t-1) → Relatedness(t)	0.07	0.03	**0.016**	[0.01, 0.13]	-0.10	0.03	**<0.001**	[-0.16, -0.04]
Relatedness(t-1) → Emotional integration(t)	0.08	0.05	0.067	[-0.02, 0.18]	-0.08	0.06	0.119	[-0.18, 0.04]
Emotional integration(t) → Relatedness(t)	0.12	0.03	**<0.001**	[0.06, 0.18]	-0.07	0.03	**0.002**	[-0.13, -0.02]
Emotional suppression(t-1) → Relatedness(t)	-0.10	0.04	**0.008**	[-0.18, -0.02]	0.14	0.04	**<0.001**	[0.07, 0.22]
Relatedness(t-1) → Emotional suppression(t)	-0.08	0.04	**0.021**	[-0.17, -0.01]	0.20	0.04	**<0.001**	[0.11, 0.30]
Emotional suppression(t) → Relatedness(t)	-0.29	0.04	**<0.001**	[-0.38, -0.21]	0.27	0.04	**<0.001**	[0.20, 0.34]
Between participants								
Means								
Emotional integration(μ)	2.52	0.08	**<0.001**	[2.35, 2.69]				
Emotional suppression(μ)	2.25	0.09	**<0.001**	[2.05, 2.40]				
Relatedness(μ)	4.14	0.05	**<0.001**	[4.05, 4.25]	1.74	0.07	**<0.001**	[1.60, 1.86]

Est.=unstandardized estimates; Est. St.=estimates for fixed within effects are standardized using the STDYX Standardization in M*plus*. *p*=Bayesian equivalent to two-sided *p*-values. They are interpreted 'as the proportion of the posterior distribution on the opposite side of 0 than the posterior mean' (McNeish & Hamaker, 2020). Significant associations are indicated in bold. Abbreviations: ML-VAR, multilevel vector autoregressive model

gressive effects were found for all four variables (emotional integration, emotional suppression, competence need satisfaction, competence need frustration).

As expected by H1a and H1b, significant positive associations appeared between emotional integration and competence need satisfaction and between emotional suppression and competence need frustration. In addition, there were significant negative concurrent associations between emotional integration and competence need frustration and between emotional suppression and competence need satisfaction.

As predicted by H2a, we found significant positive reciprocal effects between emotional integration and competence need satisfaction. Individuals' emotional integration on a previous day positively predicted competence need satisfaction on the next day, and vice versa.

Table 5 Model results of dynamic structure equation models (ML-VAR) examining associations between emotion regulation and competence satisfaction and frustration

	Est.	Est. St.	p	95% CI	Est.	Est. St.	p	95% CI
Within participants								
Emotional integration(t-1) → Emotional integration(t)	0.33	0.05	**<0.001**	[0.24, 0.44]				
Emotional suppression(t-1) → Emotional suppression(t)	0.54	0.06	**<0.001**	[0.43, 0.64]				
	Competence satisfaction				**Competence frustration**			
Competence(t-1) → Competence(t)	0.19	0.04	**<0.001**	[0.12, 0.26]	0.35	0.04	**<0.001**	[0.27, 0.42]
Cross-Lagged Effects								
Emotional integration(t-1) → Competence(t)	0.20	0.04	**<0.001**	[0.13, 0.27]	-0.15	0.03	**<0.001**	[-0.21, -0.08]
Competence(t-1) → Emotional integration(t)	0.15	0.07	**0.020**	[0.01, 0.28]	-0.10	0.06	0.051	[-0.20, 0.02]
Emotional integration(t) → Competence(t)	0.18	0.03	**<0.001**	[-0.11, 0.24]	-0.10	0.03	**<0.001**	[-0.16, -0.05]
Emotional suppression (t-1) → Competence(t)	-0.20	0.04	**<0.001**	[-0.28, -0.12]	0.13	0.04	**<0.001**	[0.07, 0.20]
Competence(t-1) → Emotional suppression(t)	-0.00	0.04	0.472	[-0.08, 0.08]	0.23	0.05	**<0.001**	[0.14, 0.33]
Emotional suppression (t) → Competence(t)	-0.17	0.04	**<0.001**	[-0.25, -0.09]	0.26	0.04	**<0.001**	[0.18, 0.33]
Between participants								
Means								
Emotional integration(μ)	2.50	0.09	**<0.001**	[2.34, 2.70]				
Emotional suppression(μ)	2.28	0.09	**<0.001**	[2.10, 2.45]				
Competence(μ)	3.41	0.05	**<0.001**	[3.30, 3.52]	2.65	0.07	**<0.001**	[2.50, 2.80]

Est.=unstandardized estimates; Est. St.=estimates for fixed within effects are standardized using the STDYX Standardization in M*plus*. *p*=Bayesian equivalent to two-sided *p*-values. They are interpreted 'as the proportion of the posterior distribution on the opposite side of 0 than the posterior mean' (McNeish & Hamaker, 2020). Significant associations are indicated in bold. Abbreviations: Abbreviations: ML-VAR, multilevel vector autoregressive model

As predicted by H2b, we found significant bidirectional cross-lagged associations in the expected direction between emotional suppression and competence need frustration. Individuals' emotional suppression on a previous day positively predicted individuals' competence frustration on the next day, and vice versa. In addition, there was a significant negative effect of previous-day emotional integration on same-day competence need frustration and a non-significant negative effect of previous-day emotional integration on same-day competence need frustration. Finally, previous-day emotional suppression negatively predicted next-day competence need satisfaction, but the opposite path (from competence satisfaction to emotional suppression) was non-significant.

4 Discussion

In this diary study, we used a dynamic perspective to explore relations between emotional integration or suppression and basic need satisfaction or frustration. The results supported our hypotheses, with a few exceptions. As in previous studies, emotional integration was positively associated with basic need satisfaction, and emotional suppression was positively associated with basic need frustration both within and across days. Our hypotheses focused primarily on the congruent associations between emotional integration and need satisfaction and between emotional suppression and need frustration. The additional cross-pattern associations (integration with need frustration and suppression with need satisfaction) were examined on an exploratory basis to provide a more comprehensive picture of the daily dynamics.

Notably, our results supported most of our hypotheses of reciprocal relations between emotional integration/suppression and basic need satisfaction/frustration. Specifically, emotional integration and autonomy and competence need satisfaction were reciprocally related across days. In addition, emotional suppression and autonomy, relatedness, and competence need frustration were reciprocally related across days. Importantly, emotional suppression and autonomy and relatedness need satisfaction were also reciprocally related across days, and there was a very close-to significance negative reciprocal effect between emotional integration and competence need frustration. However, we did not find a reciprocal relation between emotional integration and relatedness need satisfaction. Previous-day emotional integration positively predicted the next day's relatedness satisfaction but not vice versa.

The observed day-to-day links may be driven by underlying psychological mechanisms rooted in SDT. Emotional experiences play a critical role in directing individuals towards desired goals and shaping well-being (Benita et al., 2020, 2023; Roth & Benita, 2023). In this sense, the use of emotional integration in the face of emotionally eliciting events may allow individuals to draw on the information embedded in their emotions and openly seek opportunities to satisfy their needs. Such experiences, in turn, may reinforce the use of emotional integration, as they promote open and non-defensive coping and enhance individuals' curiosity about their emotional experiences (Benita, 2020; Roth et al., 2019). In contrast, the use of emotional suppression may limit individuals' ability to rely on emotions as a source of useful information. As a less adaptive strategy, emotional suppression can narrow individuals' scope of awareness and opportunities for agency, preventing them from engaging in activities that could satisfy their psychological needs. Such experiences, in turn, may reinforce the use of emotional suppression, as they promote defensive functioning characterized by limited emotional awareness and a reduced tendency to explore or reflect on emotions (Benita et al., 2020; Roth et al., 2019, 2023).

This study builds on and extends previous cross-sectional research demonstrating links between emotional integration and basic need satisfaction and between emotional suppression and basic need frustration (e.g., Benita et al., 2020; Brenning et al., 2022; Formosa et al., 2024; Van der Kaap-Deeder et al., 2021). Its use of a diary method and a DSEM approach yields new and nuanced insights into the daily, reciprocal relations among emotional integration, emotional suppression, and need-based experiences. The findings suggest these emotion regulation strategies and experiences of need satisfaction and frustration dynamically reinforce one another across days.

Our findings support SDT's eudaimonic activity model, wherein a lifestyle characterized by openness to experience is intertwined with the satisfaction of basic psychological needs (Martela, 2023; Martela & Ryan, 2023). The finding that emotional integration both predicts and is predicted by basic need satisfaction across days supports the idea that this active, open way of living reinforces itself over time. The dynamic interplay we observed between emotion regulation and the satisfaction or frustration of basic psychological needs may thus be central to understanding the experience of eudaimonia. Specifically, just as emotional integration facilitates need satisfaction, experiences of autonomy and competence foster continued emotional exploration, creating an upward spiral of growth and well-being.

Our findings also provide evidence of a contrasting pathway characteristic of non-eudaimonic living, in which emotional suppression and basic need frustration are interrelated. This pathway is marked by a constricted and compartmentalized mode of functioning, where emotional experiences, particularly negative ones, are avoided, distorted, or insufficiently processed. Importantly, our results suggest emotional suppression is reciprocally related to reduced satisfaction of autonomy and relatedness needs. Thus, emotional suppression is associated not only with the 'toxic' experiences that accompany need frustration, but also with the absence of healthy, fulfilling experiences. Both forms of experience may predict and be reinforced by emotional suppression. In other words, increased basic need frustration and diminished need satisfaction may foster a tendency to avoid or suppress emotional experiences, which in turn, may perpetuate continued need frustration, creating a downward spiral.

An important contribution of this research is its examination of the relations between emotion regulation strategies and each basic psychological need separately. By disaggregating these variables, we could explore the unique associations between the satisfaction or frustration of each need and specific regulatory strategies. Notably, unlike the reciprocal relations between emotional integration and autonomy and competence need satisfaction, in our study, emotional integration predicted next-day relatedness need satisfaction but was not predicted by prior-day relatedness need satisfaction. Similarly, emotional integration negatively predicted next-day relatedness need frustration, but the reverse was not observed. This pattern suggests emotional integration facilitates a sense of relatedness, perhaps because it enables individuals to share and process emotional experiences with others the following day. However, relatedness satisfaction or frustration does not appear to influence next-day emotional integration, supporting the view that emotional integration is an intrapersonal strategy fostering optimal interpersonal functioning. This interpretation aligns with previous studies highlighting the interpersonal benefits of emotional integration (e.g., Benita et al., 2017; Shahar et al., 2018). In this context, our finding that emotional suppression was reciprocally related to both increased relatedness need frustration and reduced relatedness need satisfaction suggests such experiences may lead individuals to turn inward and avoid disclosing their emotional experiences, perpetuating a sense of isolation and detachment.

4.1 Limitations and Future Directions

Admittedly, this study had several limitations. First, although it established a temporal order between variables, supporting the possibility of different causal pathways, it was correlational in nature, and definitive causal conclusions cannot be drawn from the data. To establish causality, future research should employ experimental designs.

Second, a subset of participants completed only a few diary entries. Although the DSEM framework minimizes potential bias by weighting each participant according to the number of available observations, such partial participation may limit the generalizability of the findings, as it could reflect lower engagement or less variability in daily experiences.

Third, we focused on two emotion regulation strategies among the many that individuals commonly use in daily life. Moreover, we adopted SDT's framework for emotion regulation (Ryan & Deci, 2017), but much of the existing literature draws on Gross's (2015) extended process model. We selected these two strategies because they are the most widely studied within the SDT framework (e.g., Benita, 2020; Brenning et al., 2022; Van der Kaap-Deeder et al., 2021; Roth & Benita, 2023; Roth et al., 2019). Despite this focused approach, we believe our investigation is relevant to a significant portion of the broader emotion regulation literature.

Fourth, the study's reliance on daily self-reports may have introduced shared-method variance. Additionally, although within-person reliabilities were modest, this pattern is common in daily diary research, where researchers typically use a small number of items to reduce participant burden (Yang et al., 2022). Such attenuation likely results in conservative estimates of within-person effects, meaning that the observed relations may underestimate the magnitude of these associations. In our study, particularly low reliability estimates were obtained for need satisfaction and need frustration. Importantly, these items were derived from a well-validated and widely used scale (Chen et al., 2015) and previously used in several daily diary studies (e.g., van der Kaap-Deeder et al., 2017; Windsor et al., 2024). Nevertheless, the low relibiliies observed suggest interpretation of the several marginally significant effects we observed in our study as non-significant should be done cautiously.

Fifth, participants completed the daily measures once per day and were asked to reflect on their overall experiences during that day. Future research could incorporate shorter and more frequent assessments of emotion regulation and basic need satisfaction or frustration throughout the day (e.g., immediately following emotional events). Comparing such momentary assessments with longer-term measures (e.g., once daily or at the beginning and end of a week over a month) could offer valuable insights into temporal dynamics and enhance the ecological validity of the findings.

Sixth, within-person autoregressive and cross-lagged slopes were modeled as fixed rather than random effects. This choice reflects the short 10-day time series, which is insufficient for reliably estimating random slope variance in DSEM. However, this approach does not allow examination of potential individual differences in these within-person dynamics. Future studies with longer or more intensive designs could address this question.

Finally, the wide time window given for participants to complete the surveys (from noon onwards), which means their reports may have reflected different aspects of their daily experiences. Although, as noted above, survey completion time was not directly related to any of the study variables, it is possible that the meaning ascribed to these variables changed across the day. For example, completing the survey at noon may have prompted reflections more related to academic or university activities, whereas completing it late at night may have evoked experiences tied to interpersonal or evening contexts. Future research should employ shorter and more consistent timeframes and consider using more frequent assessments throughout the day.

5 Conclusion

The results underscore that emotion regulation strategies and experiences of psychological need satisfaction are intertwined in daily life, influencing one another over time. By revealing reciprocal relations between emotion regulation and basic need satisfaction and frustration, the findings highlight that these processes mutually shape and reinforce each other across days rather than unfolding in a unidirectional manner. These findings align with SDT's eudaimonic perspective (Martela, 2023), which conceptualizes well-being as a dynamic, ongoing process shaped by daily behaviors and experiences. Specifically, our findings suggest emotional integration is reciprocally associated with greater daily need satisfaction and lower need frustration, reflecting patterns consistent with eudaimonic functioning. In contrast, emotional suppression is reciprocally related with increased need frustration and reduced need satisfaction, reflecting a non-eudaimonic outcome. Altogether, the study highlights the critical role of emotion regulation in sustaining the ongoing experience of basic need satisfaction and frustration.

Declarations

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