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ORIGINAL RESEARCH

What predicts the initiation and outcomes of interpersonal emotion regulation in everyday life?

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Abstract

Research examining initiation and outcomes of ER has primarily examined when people regulate their own emotions. In the present study, we investigated what predicts the initiation and outcomes of interpersonal emotion regulation (IER). We also examined whether the associations varied by major depressive disorder (MDD), which is characterized by several emotion regulation challenges, including in IER. Adults with and without MDD (N = 215) completed a 14-day EMA protocol, reporting on their emotional experience, recent events, and recent IER interactions. For IER initiation, we examined two features of subjective emotional experiences: participants' affect (negative affect, positive affect) and emotional awareness (attention to emotion, emotional clarity), and two situational characteristics: event unpleasantness and goal interruption. For IER outcomes, we focused on sharing partners' characteristics. Analyses utilized multilevel modeling. We focus on reporting within-person findings. Participants were more likely to initiate IER when the situation was more unpleasant and when goals were interrupted. Regarding IER outcomes, the extent to which participants experienced improved feelings about the problem and relational closeness varied depending on who was the sharing partner. Additionally, perceived warmth of sharing partner was associated with better IER outcomes. Initiating IER did not differ by MDD status, whereas associations between perceived warmth and IER outcomes did. Findings elucidate factors relevant to the IER process and serve to provide important insight into the contexts in which individuals might seek others to support their regulation and when the sharing partner were the most helpful in IER.

Keywords Interpersonal emotion regulation · Social sharing · Major depressive disorder · Intrinsic emotion regulation · Ecological momentary assessment · Experience sampling

Introduction

Interpersonal emotion regulation (IER) is a goal-directed dynamic process in which social resources are utilized to assist someone in regulating their emotions (Rimé, 2009; Zaki & Williams, 2013). The field of emotion regulation has increasingly focused on IER, given the importance of social relationships, the human tendency to seek and interact with others (Baumeister & Leary, 1995; Coan & Sbarra, 2015; Kappas, 2013), and that emotion regulation often occurs in social contexts (Dixon-Gordon et al., 2015; Liu et al., 2021; Tran et al., 2022). How much one seeks IER is associated with greater well-being (Williams et al., 2018). IER has also been found to benefit people who struggle with emotion regulation difficulties. For example, people with major depressive disorder (MDD), who experience difficulties with regulating emotion on their own (e.g., Liu & Thompson, 2017), also benefit from IER (Liu et al., 2024). Understanding what contributes to the IER process is critical. In particular, research is needed to clarify which factors motivate initiation of intrinsic IER, the extent to which one seeks others to help regulate one's emotions (Hofmann, 2014; Zaki & Williams, 2013), and which factors contribute to outcomes of the IER process. The present research used ecological momentary assessment (EMA) to examine predictors of engagement of intrinsic IER initiated via social sharing and IER outcomes in daily life and whether they differ by MDD.

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Motivational factors for intrinsic IER

Most research on intrinsic IER has examined the various strategies in which individuals seek others to help regulate their emotions. For example, researchers have considered the emotional and regulatory outcomes of individuals using certain IER strategies (Niven et al., 2009), such as venting or emotional disclosure (Aldao & Dixon-Gordon, 2014; Nils & Rimé, 2012), reappraisal or reframing (Horn & Maercker, 2016), and physical touch (Debrot et al., 2013, 2014). However, considering that people routinely engage in IER in a variety of contexts in daily life (Liu et al., 2021; Tran et al., 2022), it is important to understand the factors that motivate people to initiate intrinsic IER.

Both theoretical and empirical accounts suggest that individuals are motivated to regulate emotions based on discrepancies between their emotion goals, what they ideally or want to feel, and what they are currently experiencing (Tamir et al., 2015). Although research has examined various types of motives when regulation occurs in daily life (Kalokerinos et al., 2017; Tamir, 2016), people may weigh the cost and benefits of regulating prior to initiating regulation (Tamir, 2021). Thus far, it is unclear which factors contribute to when individuals decide to initiate regulation by seeking others. Understanding when individuals engage in intrinsic IER may help to identify when IER might be used more often and when it might be more adaptive than regulating emotions on one's own.

Subjective features of one's emotional experience are often important for when and why people regulate their emotions. Here, we focus on literature examining emotion and emotion regulation in adults. Individuals are often motivated to feel less negative and feel more positive (Tamir, et al., 2020), and research has shown that elevated momentary negative affect (NA) is associated with increased use of regulation strategies (Brans et al., 2013). The intensity of one's NA is likely also relevant to when an individual engages in intrinsic IER. Indeed, more NA is associated with increased social sharing of information and emotions (Berger, 2011; Heiy & Cheavens, 2014; Rimé et al., 2020). Individuals might be more likely to seek others to help regulate their emotion when their NA is intense or overwhelming. In contrast, positive affect (PA) has been inconsistently linked to engagement of emotion regulation, with findings suggesting that individuals are less likely to regulate PA in comparison to NA (Barrett et al., 2001; Brans et al., 2013; Gross et al., 2006). However, diminished PA might motivate individuals to want to feel more positive, possibly seeking help from others to increase their PA.

Another feature of people's emotional experiences tied to emotion regulation is emotional awareness (Lane & Schwartz, 1987; Salovey et al., 1995). Attention to emotion is a dimension of emotional awareness defined as how much individuals notice and value their feelings (Lane & Schwartz, 1987; Salovey et al., 1995). Attention to emotion has links with regulation difficulties and NA (Gratz & Roemer, 2004; Thompson et al., 2011). Given that emotion regulation requires one to recognize their current emotional state and the need for regulation (Tamir et al., 2020), paying greater attention to one's emotion is likely to be associated not only with greater use of emotion regulation for one's self, but with likelihood of engaging in IER.

Another dimension of emotional awareness is emotional clarity, which refers to the extent to which one understands his or her emotional experiences and feelings (Coffey et al., 2003; Gohm & Clore, 2000, 2002). Higher emotional clarity is generally adaptive (Extremera et al., 2009; Lischetzke et al., 2012), and deficits in emotional clarity are key aspects of emotion regulation difficulties and dysregulation (Gratz & Roemer, 2004; Vine & Aldao, 2014). When people are confused about their emotions, they may be more motivated to seek others to help make sense of their emotions, such as clarifying the nature and source of their emotions.

Besides subjective features of emotional experiences, situational characteristics may also influence one's motivation to engage in intrinsic IER. Experiencing unpleasant events or occasions when things do not go according to plan (i.e., goal interruption) may prompt people to share or seek support in regulating emotions. In fact, research has found that in situations in which an unexpected or unpleasant event occurs, individuals may experience negative feelings regarding disruptions to their existing expectations, motivating them to seek or recruit others to restore emotional and cognitive states when an individual lacks the means to achieve their own goals (Heckhausen et al., 2010; Rivers et al., 2007).

Associations between emotional and situational motivational factors and IER initiation might differ for individuals with or without MDD. MDD is a mood disorder that is characterized by elevated NA and diminished PA, as well as difficulties with emotion regulation (APA, 2013; Houben et al., 2015; Liu & Thompson, 2017). On the one hand, in the case of individuals with MDD, elevated social anhedonia and withdrawal (Blanchard et al., 2001) as well as a greater tendency to engage in emotional avoidance and suppression (Visted et al., 2018) may reduce their likelihood of engaging in IER. Additionally, those with (vs. without) MDD may regulate emotion less flexibly in response to factors that often signal emotion regulation demands (e.g., high NA, unpleasant event; Chen & Bonanno, 2021), so their IER initiation may be less tied to various motivational factors. Based on these lines of reasoning, the associations between hypothesized predictors and IER initiation may be weaker among those with (vs. without) MDD.

On the other hand, individuals with MDD are more likely to seek others for reassurance and feedback (Evraire & Dozois, 2011; Joiner et al., 1999; Rehman et al., 2008). As such, they may be more inclined to seek IER in response to subjective emotional experiences and situational experiences. The links between attention to emotion and emotional clarity with IER might be more salient for individuals with MDD, as they may need the support of others to help regulate their emotions. Furthermore, individuals with MDD struggle with goal shifting (Street, 2002), so when they experience unpleasant situations and interruption of one's goals, they may particularly need for IER. These processes would suggest that the link between our theorized predictors and IER initiation may be stronger for those with (vs. without) MDD. Considering the opposing patterns suggested by the relevant literature, it is important to explore the moderating effects of MDD in predicting IER initiation, which helps to inform whether those with MDD exhibit difficulties at an early stage of IER.[1]

Characteristics of the sharing partner that contribute to IER outcomes

In addition to when individuals might initiate IER, it is important to consider which factors may benefit the immediate outcomes of IER, as efficacious IER has been linked with well-being (William et al., 2018). We operationalize IER outcomes in two ways, one in which individuals feel differently about the situation that prompted them to initially seek IER, and the other when individuals might feel a differing level of closeness to the individuals with whom they engaged in IER. Like with intrapersonal ER (English et al., 2017; Springstein et al., 2023), the IER process has an impact at the individual and interpersonal level (Rauers & Riediger, 2023). In the context of intrinsic IER initiated via social sharing, at an individual-level, the sharer may benefit from IER in feeling more positive or less negative about their situation, which we refer to as problem outcome. At the interpersonal level, IER may foster feelings of closeness or improve the interpersonal relationship (Horn et al., 2019; Rimé, 2009), which we refer to as relationship outcome. Both problem (i.e., changes in how the sharer feels about their problem) and relationship outcomes (i.e., changes in how the sharer feels with the sharing partner) are important consequences of the IER process.

Characteristics of the sharing partner likely contribute to IER outcomes. Specifically, the nature of the relationship between the sharer and sharing partner could be an important consideration for IER outcomes. Distinct relationships can play different roles in well-being across contexts (Pössel et al., 2018; Walen & Lachman, 2000). People may be more motivated to preserve and promote relationship quality when interacting with close others (e.g., romantic partner, family, friend). Engaging in IER with a friend, family member, or romantic partner, may result in better relationship outcomes than with non-close others (e.g., colleague or acquaintance). Close others also tend to have greater knowledge of one's life and insights into one's personality and behaviors, so they may be more effective at improving one's feelings about the problem.

Besides the nature of one's relationship with the sharing partner, the sharing partner's *perceived warmth* could also play a role in IER outcomes. Although there are few studies directly examining warmth and emotion regulation broadly, perceived warmth can be linked to interpersonal outcomes. For example, Howe et al. (2001) found that greater perceived warmth in siblings was associated with greater self-disclosure and emotional understanding. In the social cognition literature, warmth is considered a dimension for deciding on engagement (i.e., perceiving good-will from the other; Fiske et al., 2007). From these separate areas of study, perceived warmth from a sharing partner could be important for how much a sharer feels after an IER interaction. Specifically, when perceiving the sharing partner interpersonally warm (vs. cold) during IER, the sharer may be more willing to take the sharing partner's regulation attempts into consideration and view the sharing partner as having good intentions and caring about them (Cuddy et al., 2011; Horowitz et al., 2006), resulting in better problem and relationship outcomes. How perceived warmth is associated with IER outcomes in daily life remains an important empirical question.

Because individuals with MDD experience greater emotional distress (Liu & Alloy, 2011) and difficulties with regulating emotion on their own (Liu & Thompson, 2017) than their non-depressed counterparts, those with MDD may be benefit in particular from others' help with emotion regulation (Marroquín, 2011). Indeed, research on the same sample as the present research has found that those with MDD benefit similarly and sometimes more than their peers without MDD from IER interactions (Liu et al., 2024). Additionally, people with MDD (vs. without) have been found to show greater reactivity to positive interpersonal daily events (Starr & Hershenberg, 2017). Consequently, they may respond especially well to positive IER interactions, such as

[1] IER researchers sometimes use the term "regulator" to refer to the person who attempts to influence another person's emotions and "target" to the person whose emotions are influenced. In the present research, we think both the person who is seeking intrinsic IER and the person who influences the sharer's emotions can be thought of as the "regulator" as they both actively engage in behaviors to regulate their own and another's emotions, respectively. As such, we use "sharer" and "sharing partner" to refer to the person who initiates IER via social sharing and the person from whom the sharer seeks IER support, respectively, in the context of the current research.

when the sharing partner is interpersonally warm. However, impairments in social (Kupferberg et al., 2016) and cognitive functioning (Gotlib & Joormann, 2010) could constrain the benefits of IER for those with MDD. In the context of interaction partners, individuals with MDD experience negative biases in interpreting social information (Joiner et al., 1999) and perceive less positive interactions with close others (Zlotnick et al., 2000), interfering with their ability to reap benefits from a supportive, warm sharing partner during IER. Considering the complex ways in which MDD may affect IER outcomes, we explored whether factors that contribute to sharer's IER outcome vary by the sharer's MDD status.

Current investigation

IER routinely occurs in daily life and has important implications for well-being (Dixon-Gordon et al., 2015; Liu et al., 2021; Tran et al., 2022; Williams et al., 2018). Thus far, it is unclear what motivational factors are important for IER and how characteristics of the sharing partner play a role in the outcomes of IER, and whether such factors differ based on MDD status. In the current study, we used EMA, where people were repeatedly surveyed in naturalistic settings, to examine IER in daily life among people with current MDD, remitted MDD, and a healthy control group. EMA has high ecological validity and reduces retrospective bias (Shiffman et al., 2008). Further, EMA data provide a fine-grained understanding of people's momentary experiences, permitting researchers to examine intraindividual variability, or associations at the within-person level (Molenaar, 2004; Nezlek, 2001).

Our first aim was to clarify what predicted the likelihood of engaging in intrinsic IER initiated in the form of disclosing negative experiences or feelings. We examined two subjective emotional experiences and two situational characteristics. Our two subjective emotional experiences included the sharers' subjective momentary affect (i.e., NA and PA) and emotional awareness (i.e., attention to emotion, emotional clarity). The two situational characteristics we examined included event unpleasantness and goal interruption. We expected that sharers would be more likely to initiate IER when they reported elevated NA (Hypothesis 1a), diminished PA (Hypothesis 1b), elevated attention to emotion (Hypothesis 1c), and diminished emotional clarity (Hypothesis 1d). We expected that sharers would be more likely to engage in IER when recent events were more unpleasant (Hypothesis 1e) and when goals were interrupted (Hypothesis 1f). Considering the lack of direct evidence on IER in MDD and relevant literature supporting competing directions, we explored whether findings varied based on people's MDD status.

Our second aim was to clarify what predicted IER outcomes, focusing on how the sharing partner's characteristics were related to IER outcomes at the individual level (problem outcome) and the interpersonal level (relationship outcome). We examined the sharing partner's relationship to the sharer, and the sharing partner's perceived warmth. We expected better problem and relationship outcomes when sharing partners were close others such as romantic partners, friends, and family (Hypothesis 2a), and when the sharing partner was perceived as warmer (Hypothesis 2b). Finally, we explored whether the extent to which these partner characteristics were related to IER outcomes varied by the sharer's MDD status.

Using EMA, we examined these two aims in an adult sample with and without MDD. Our theorizing and hypotheses focused on how momentary variations in predictors were associated with IER initiation and outcomes at the within-person level. However, we also explored between-person effects to investigate how individual differences in these same factors contributed to how much people sought and benefitted from IER.

Method

Participants and procedure

Participants were part of a large-scale project on emotion and MDD. A community sample was mostly recruited via a participant registry run by a medical school and advertising at businesses. A total of 215 participants ranged in age from 18 to 77 years old ($M_{age} = 44.3$, $SD_{age} = 16.1$), and 66% were women and 34% were men. The racial/ethnic composition of the sample was approximately representative of the geographic area in which the study was conducted, and consisted of 69.8% White, 19.5% Black, 2.8% Asian, 0.5% Native American, and 7.0% other/multiracial (0.5% did not report). However, educational background was generally high, with most participants earning a bachelor's degree (32.6%), a graduate or professional degree (31.6%), completing some college (24.2%), or earning a high school diploma (9.3%). About two thirds of participants (69%) were in a romantic relationship, among whom 44.3% were married or cohabiting with their romantic partner.

Interested individuals completed an initial phone screen, and those who were likely eligible were scheduled for an in-person laboratory session. (Additional methodological details can be found in the supplementary materials.) Then they received a hyperlink to a Qualtrics survey that included a series of self-report measures to complete before the laboratory session. At the laboratory session, participants

provided informed consent and were diagnostically interviewed using the Structured Clinical Interview for *DSM-5.0* (SCID-5-RV; First et al., 2015), administered by one of three clinical psychology graduate students.

We recruited three groups, which maximizes variation in depressive symptomatology. Participants were eligible if they were in a current depressive episode (n = 48), not currently in a depressive episode but had at least two fully remitted depressive episodes (n = 80), or were healthy controls (i.e., no history of mental health disorders; n = 87). In addition, eligibility required that participants speak English as their primary language and not have severe hearing or visual impairments. Exclusionary criteria included a diagnosis of current or past psychotic symptoms, bipolar I, bipolar II, and cyclothymic disorder. The sample of 215 did not not include 22 participants who experienced app problems (n = 7), withdrew (n = 7), completed less than 20% of the surveys (n = 7), or whose behaviors raised concern about the validity of their data (i.e., appeared intoxicated; n = 1).

At the laboratory session, participants completed self-report measures, cognitive tasks, and an EMA tutorial. For the tutorial, experimenters helped participants install the Status/Post iOS app, developed by Christopher Metts, M.D., on their own iPhones or a 4th-generation iPod Touch. Experimenters provided instructions and examples of the items, including asking questions to assess participant comprehension. Participants chose a 15-h window to complete the surveys and completed a practice survey.

Starting the day after the laboratory session, the EMA period began. Participants were prompted to complete five surveys a day for 14 days (i.e., 70 surveys). Surveys occurred randomly within five 3-h windows each day (M = 3 h, 0 min, 18 s apart; SD = 1 h, 1 min, 35 s). Participants had a 15-min window to start a survey. Participants completed 74.8% of surveys on average (SD = 18.3, range = 20–99%). Participants were financially compensated for the laboratory session ($12/hour) and EMA portion of the study ($40), and they received a $10 bonus if they completed at least 80% of the surveys.

EMA measures

Initiation of IER interaction

To assess the initiation of IER interactions, participants responded "yes" (coded as 1) or "no" (coded as 0) to the question, "Since the last beep, have you shared any negative experiences or feelings with anyone?" At the tutorial, participants were instructed to report situations during which they shared information in person or over the phone (e.g., text), but not to report when it was unclear whether the sharing partner received the message (e.g., not receiving a text response). They were instructed to report on IER interactions with a specific person, but not a group of people (e.g., posting on social media). If they had more than one IER interaction, participants were instructed to report on the most important one. When an IER interaction occurred, they were asked the questions below. Of the full sample, n = 198 (92.1%) participants reported having an IER interaction. The 17 participants who did not report any IER interaction were not included in the analyses predicting IER outcomes.

IER interaction characteristics of the sharing partner

Role of Sharing Partner

First, participants reported the sharing partner's relationship to the sharer by answering, "Who was the person you shared them with?" A fixed order checklist of romantic partner, family member, friend, someone at work, acquaintance, and stranger was presented. Participants could choose one option. Acquaintances (4.1%) and strangers (5.3%) were rarely endorsed so we combined these two categories, following our approach in Liu et al. (2021). As a result, the role of the sharing partner was a categorical variable with five levels.

Warmth of the Sharing Partner

Then participants reported on their sharing partners' warmth. Participants were presented with the item, "During the interaction, this person acted" and a visual analog scale (− 5 = *cold*, 5 = *warm*). The indicator appeared at the midpoint or zero, and tick marks appeared on the scale corresponding to every 1-point increment.

IER Outcomes

Participants reported on two outcomes of the IER interaction. For problem outcomes, they answered, "How did you feel about your original problem after the interaction?" using a 11-point visual analog scale (− 5 = *much worse*, 0 = *same*; 5 = *much better*). For relationship outcomes, they answered, "How did your closeness to this person change after the interaction?" using a visual analog scale (− 5 = *much less close*, 0 = *same*; 5 = *much closer*).

Subjective emotional experience

Affect

At each survey, participants rated the extent to which they felt different emotions ("I felt [EMOTION] at the time of the beep"). Six items assessed NA (bored, sad, nervous, sluggish, frustrated, angry), and six items assessed PA (relaxed,

calm, content, happy, excited, enthusiastic), each rated using a 5-point scale (0 = *not at all*; 4 = *extremely*). Items were selected to reflect various levels of activation, and similar scales are routinely administered in EMA research (e.g., Schimmack, 2003). Items for NA and PA were averaged to obtain composite scores for each survey. Internal consistency for NA and PA ranged from acceptable to excellent ($NA\omega_{within} = 0.63$, $PA\omega_{within} = 0.82$; $NA\omega_{between} = 0.89$, $PA\omega_{between} = 0.92$).

Emotional Awareness

Attention to emotion and emotional clarity were assessed with the statements, "At the time of the beep, I was paying attention to my emotions", and "At the time of the beep, I was clear about my feelings", respectively. Participants used a 5-point scale (0 = *not at all*; 4 = *a great deal*) to answer the items. The stem of these items are the items with the highest factor loadings for each respective subscale of the Trait-Meta Mood Scale (Salovey et al., 1995) and were administered in other EMA studies (e.g., Thompson et al., 2011). To assess construct validity, we tested association between trait measures of attention to emotion and emotional clarity included in the online survey (Palmieri et al., 2009). Using multilevel modeling, momentary and trait attention to emotion were significantly positively correlated (b = 0.02, SE = 0.01, $p = 0.01$), as were momentary and trait emotional clarity (b = 0.02, SE = 0.005, $p < 0.001$).

Situational characteristics

Event unpleasantness

At each survey, the unpleasantness of recent events was assessed using the following item: "Please think about the most significant event you experienced since the last survey. Was this event:". Participants indicated their response using an 11-point visual analog scale presented below the item with -5 (*very negative*) as the left anchor and 5 (*very positive*) as the right anchor. The indicator was presented at the midpoint (i.e., 0) with tick marks on the scale corresponding to every one-point increment. The item was then reverse-coded so that positive values indicate an event was more unpleasant.

Goal interruption

At each survey, goal interruption was measured with the following face valid question, "Since the last beep, did anything not go 'as planned'?" with a binary (0 = *no*, 1 = *yes*) response option. This item appeared in a block of items assessing planning, goal interruption, and behavioral flexibility that were designed to assess constructs relevant to Radically Open Dialectical Behavior Therapy (Lynch, 2018), an intervention for disorders of overcontrol. On average, participants reported goal interruption at 18.7% of completed surveys.

Data analytic plan

Analyses were conducted via R statistical software (v. 4.1.2; R Core Team, 2021). Multilevel logistic regressions were conducted for predicting likelihood of *IER initiation*, and multilevel linear regressions were conducted for predicting each *IER outcome*. Level 1 predictors of IER initiation that were continuous (i.e., NA and PA intensity, emotion attention, emotion clarity, event unpleasantness) but not binary (i.e., goal interruption) were person-mean-centered. Level 2 person mean variables, which represented person means of continuous variables (e.g., an aggregated mean score of NA) or percent of time a person endorses a response category for binary or continuous variables (e.g., percent of time a person endorsed yes for goal interruption), were grand-mean-centered.

To examine the first aim, we regressed Level 1 IER initiation on all six predictors of interest at Level 1 and their person means at Level 2:

Model Equations for Aim 1:

Level 1 Model:

$$\begin{aligned}\text{IER initiation}_{(t)ij} = {} & \beta_{0j} + \beta_{1j}\,\text{NA intensity}_{(t-1)} \\ & + \beta_{2j}\,\text{PA intensity}_{(t-1)} \\ & + \beta_{3j}\,\text{emotion attention}_{(t-1)} \\ & + \beta_{4j}\,\text{emotion clarity}_{(t-1)} \\ & + \beta_{5j}\,\text{event unpleasantness}_{(t)} \\ & + \beta_{6j}\,\text{goal interruption}_{(t)} + e_{ij}\end{aligned}$$

Level 2 Model:

$$\begin{aligned}\beta_{0j} = {} & \gamma_{00} + \gamma_{01}\,\text{NA intensity}_{(t-1)}\,\text{mean} \\ & + \gamma_{02}\,\text{PA intensity}_{(t-1)}\,\text{mean} \\ & + \gamma_{03}\,\text{emotion attention}_{(t-1)}\,\text{mean} \\ & + \gamma_{04}\,\text{emotion clarity}_{(t-1)}\,\text{mean} \\ & + \gamma_{05}\,\text{event unpleasantness}_{(t)}\,\text{mean} \\ & + \gamma_{06}\,\text{goal interruption}_{(t)}\text{-yes} + u_{0j}\end{aligned}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\cdots$$

$$\beta_{6j} = \gamma_{60} + u_{6j}$$

Because NA and PA intensity, attention to emotion, and emotional clarity were assessed at the time of the survey, whereas IER interactions were assessed "since the last beep," we conducted analyses where the former were represented by time-lagged predictors at *t*-1 (within day) when predicting IER variables at *t*. We examined all predictors simultaneously to reduce the number of statistical models and obtain the most robust findings for what predicts IER initiation (see Table S1 in the supplementary materials for results when examining each predictor of IER initiation in separate models). Of interest to Hypotheses 1a through 1f were Level 1 effects β_{1j} through β_{6j}.

To examine our second aim, we regressed sharing partner type and warmth as well as their person means on each outcome. (See Table S2 in the supplementary materials for results when examining each predictor of IER outcomes in separate models.) The model below used acquaintance/stranger as the reference level for sharing partner type; reference level was switched to examine all pairwise comparisons between different types of sharing partners.

Model Equations for Aim 2:

Level 1 Model:

$$\text{IER outcome}_{(t)ij} = \beta_{0j} + \beta_{1j}\,\text{romantic partner}_{(t)} + \beta_{2j}\,\text{family}_{(t)} + \beta_{3j}\,\text{friend}_{(t)} + \beta_{4j}\,\text{co-worker}_{(t)} + \beta_{5j}\,\text{warmth}_{(t)} + e_{ij}$$

Level 2 Model:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\,\text{romantic partner}_{(t)}\text{-yes} + \gamma_{02}\,\text{family}_{(t)}\text{-yes} + \gamma_{03}\,\text{friend}_{(t)}\text{-yes} + \gamma_{04}\,\text{co-worker}_{(t)}\text{-yes} + \gamma_{05}\,\text{warmth}_{(t)}\,\text{mean} + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

…

$$\beta_{5j} = \gamma_{50} + u_{5j}$$

For our exploratory analyses examining group differences in predictors of IER initiation and outcomes, we examined the association between a predictor and IER initiation or outcome in separate models for each predictor. Specifically, we included the predictor at Level 1, its person mean(s) and MDD status at Level 2, cross-level interaction between Level 1 predictor and MDD status, and Level 2 interaction between person mean(s) and MDD status. We examined group differences in separate models due to insufficient statistical power of examining all six (for Aim 1) or five (for Aim 2) cross-level interactions in a combined model.

Given the large number of effects estimated in the current research and concern about Type I error rate, we applied the Benjamini–Hochberg adjustments to the multiple effects of interest estimated in each model. All significant findings held after applying the Benjamini–Hochberg adjustments (Benjamini & Hochberg, 1995). Unadjusted *p* values are presented in the Results section. Please see Table S3 in the supplementary materials for details of our adjustment procedures and adjusted *p* values associated with each effect of interest.

Transparency and openness

This study was not preregistered. Relevant data and R analysis code can be found at https://osf.io/ct26p/?view_only=6e2ae2d17758451ebb133de9f4116135. Sample size was determined using an a priori power analysis for the larger project (e.g., Thompson et al., 2009).

Results

Motivational factors for intrinsic IER

To contextualize the results testing our main hypotheses, we report descriptive information about the frequency of IER interactions, which were originally reported in Liu et al., (2024). Approximately, 92% of participants reported at least one IER interaction. IER interactions were reported at 14.9% of completed surveys, which is about eight IER interactions on average across the sampling period (roughly once every other day). Those with current MDD reported engaging in IER at a similar frequency as controls, but remitted MDD group engaged in IER interactions more than both groups. Participants engaged in IER most frequently with close others, including friends (M = 31.0%, SD = 30.1%), romantic partners (M = 26.1%, SD = 32.1%), and family members (M = 22.0%, SD = 26.5%). They engaged in IER less frequently with non-close others, including co-workers (M = 11.5%, SD = 17.8%) and acquaintances or strangers (M = 9.38%, SD = 18.7%). Within- and between-personal correlation coefficients are presented in Table 1. We hypothesized that elevated NA (Hypothesis 1a), diminished PA (Hypothesis 1b), elevated attention to emotion (Hypothesis 1c), reduced emotional clarity (Hypothesis 1d), elevated event unpleasantness (Hypothesis 1e), and elevated goal interruption (Hypothesis 1e) to predict a higher likelihood of initiating IER.

When all predictors of IER initiation were entered simultaneously, some but not all of our hypotheses were supported. Only momentary event unpleasantness and

Table 1 Within- and Between-Person Correlations of Continuous Predictors of IER Initiation

Variables	*M* (*SD*)	1	2	3	4	5	6	7	8	9	10
1. Negative Affect	0.47 (0.37)	–	− .42***	.23***	.08***	.31***	.23***	.23***	− .15***	− .21***	− .13***
2. Positive Affect	1.51 (0.62)	− .16**	–	.06***	.23***	− .34***	− .19***	− .13***	.20***	.26***	.20***
3. Attention to Emotion	1.38 (0.78)	.15*	.43***	–	.57***	.05***	.13***	.19***	− .03	− .07***	− .02
4. Emotional Clarity	1.88 (0.83)	− .01	.60***	.73***	–	− .03***	.10***	.15***	.000	− .002	− .003
5. Event unpleasantness	1.45 (1.12)	.24***	− .53***	− .38***	− .37***	–	.31***	.17***	− .22***	− .24***	− .21***
6. Goal Interruption	0.19 (0.18)	.28*	− .04	.18	.11	− -.07	–	.35***	− .12***	− .14***	− .13***
7. IER Initiation	0.15 (0.12)	.32	− .006	.23**	.20	− 11	.60***	–	− .003	− .006	− .009
8. Warmth	2.35 (1.55)	− .25**	.22**	.20*	.15	− .52***	− .04	− .02	–	.58***	.57***
9. Problem Outcome	1.44 (1.33)	− .13	.39***	.37***	.28*	− .71***	.09	.02	.77***	–	.58***
10. Relationship Outcome	1.13 (1.27)	.09	.16	.34***	.12	− .50***	.11	− .003	.58***	.85***	–
Intraclass correlations (ICC)		.41	.43	.36	.40	.21	.31	.21	.24	.20	.28

Means and standard deviations of person-aggregated values (averaged across surveys for each participant) of each construct are reported in the table; for goal interruption and IER initiation (binary-coded variables), their person-aggregated values were percent of time participants endorsed that something did not go as planned and engaged in IER since the last survey, respectively. Correlation coefficients above and below the diagonal represent within-person and between-person, respectively

*$p < .05$, **$p < .01$, ***$p < .001$

Table 2 Predictors of Initiation of Intrinsic IER Examined in a Combined Model

Predictors	*b*	*SE*	*p*
Intercept	− 2.23	0.07	< .001
NA intensity$_{t-1}$	0.17	0.09	.051
NA intensity$_{t-1}$ mean	0.60	0.19	**.002**
PA intensity$_{t-1}$	0.01	0.06	.86
PA intensity$_{t-1}$ mean	− 0.17	0.14	.23
Emotion attention$_{t-1}$	0.04	0.04	.41
Emotion attention$_{t-1}$ mean	0.13	0.13	.30
Emotion clarity$_{t-1}$	0.01	0.05	.82
Emotion clarity$_{t-1}$ mean	0.15	0.13	.23
Event unpleasantness$_{t}$	0.10	0.02	**< .001**
Event unpleasantness$_{t}$ mean	− 0.07	0.07	.32
Goal interruption$_{t}$-yes (ref = no)	0.91	0.09	**< .001**
Goal interruption$_{t}$-yes mean	1.16	0.37	**.002**

Significant within- and between-person effects of predictors are bolded ($p < .05$). As major depressive disorder (MDD) status did not moderate the associations between any of these predictors and initiation of IER (Table 1), we did not test the moderating effects of MDD status for this combined model. All findings remained the same when controlling for participant gender and age

NA negative affect; *PA* positive affect; *ref* reference level; *t* measured at the same survey; *t-1* measured at the prior survey within the same day

goal interruption (i.e., within-person level) uniquely predicted likelihood of engaging in IER in expected directions (Table 2). All other within-person effects were not significant (e.g., momentary NA); individual models examining the within- and between-person effects of each predictor are presented in the supplementary materials, Table S1. NA and goal interruption at the between-person level were significant predictors of IER initiation; individuals with higher NA and more frequent goal interruptions are more likely to engage in IER. When examining associations between each predictor and IER initiation, MDD status did not moderate the associations between any predictor and IER initiation.

Factors that contribute to the IER outcomes

Table 3 summarizes results for predictors of IER outcomes (simultaneously examined in the model; see Table S2 in the supplementary materials for individual models examining the within- and between-person effects of each predictor)**.** Regarding sharing partner's relationship to the sharer, we found significant associations at the within-person level. Our findings only partially supported our Hypothesis 2a that people would have the most improved IER outcomes following sharing with close others such as romantic partners, friends and family, versus less close others like co-workers or acquaintances/strangers. Specifically, individuals reported the most improved problem outcomes following sharing

Table 3 What Predicts Outcomes of Interpersonal Emotion Regulation

Predictors	Problem Outcome				Relationship Outcome			
	Step 1: Main Effects of Predictors			Step 2: Moderation of MDD Status	Step 1: Main Effects of Predictors			Step 2: Moderation of MDD Status
	b	*SE*	*p*		*b*	*SE*	*p*	
Intercept	1.31	0.17	< .001	Did not test[a]	0.36	0.15	.02	Did not test[b]
SP type-partner	− 0.18	0.20	.35		0.81	0.17	**< .001**	
SP type-family	0.04	0.19	.82		0.95	0.16	**< .001**	
SP type-friend	0.27	0.18	.14		0.85	0.16	**< .001**	
SP type-work	0.29	0.21	.16		0.49	0.18	**.005**	
SP type-partner mean	0.74	0.50	.14		− 0.21	0.52	.68	
SP type-family mean	0.94	0.53	.08		0.26	0.56	.64	
SP type-friend mean	0.62	0.52	.23		0.46	0.54	.40	
SP type-work mean	0.76	0.57	.19		0.05	0.61	.94	
SP warmth	0.51	0.02	**< .001**	**MDDc > (MDDr = CTL)**	0.43	0.02	**< .001**	**MDDc > (MDDr = CTL)**
SP warmth mean	0.57	0.04	**< .001**	**(MDDc = MDDr) > CTL**	0.43	0.05	**< .001**	**MDDc > CTL**; MDDc = MDDr; MDDr = CTL

Significant main and moderating effects are bolded ($p < .05$). > denotes the association was significantly ($p < .05$) stronger for the group on the left side than that for the group on the right side; < denotes the association was significantly ($p < .05$) stronger for the group on the right side than that for the group on the left side; = denotes the associations between the groups on both sides were not significantly different from each other ($p \geq .05$). All findings remained the same when controlling for participant gender and age

MDDc the current-MDD group; *CTL* the control group; *MDD* major depressive disorder; *n.s.* none of the pairwise group comparisons were significant for the corresponding effect; *MDDr* the remitted-MDD group ref = reference level; *SP* sharing partner; work = co-worker

[a]Acquaintances or stranger was the reference level for the sharing partner type variable included in the model presented in this table. Estimated mean values of problem outcome for each type of sharing partner are ranked as follows (from highest to lowest): friend, co-worker, family member, acquaintance or stranger, and romantic partner. Estimated mean values of relationship outcome for each type of sharing partner are ranked as follows (from highest to lowest): family member, friend, romantic partner, co-worker, and acquaintance or stranger. [b]We did not examine group moderation for these sets of associations due to concern about Type I error given the large number of analyses and difficulty with interpreting these findings when interpretations are made relative to the reference levels of the categorical variables (i.e., sharing partner type and IER goals). However, we included analyses examining interactions between IER goals and group due to the small number of analyses and ease of interpretation of the findings

with friends and co-workers and least improved outcomes following sharing with romantic partners. For relationship outcomes, individuals reported the most improved relationship outcomes following sharing with family, friends, and romantic partners and the least improved outcomes following sharing with acquaintances or strangers.[2] Pairwise comparisons of IER outcomes associated with different types of sharing partners are presented in Table S4 of the supplementary materials.

As expected (Hypothesis 2b), greater sharing partner's *perceived warmth* was positively associated with both IER outcomes. At the within-person level, participants reported better problem and relationship outcomes when perceiving a sharing partner as warmer than what they encounter on average. Additionally, the within-person association between sharing partner's perceived warmth and each outcome was significantly stronger for the current-MDD group than for the remitted-MDD group (problem outcome: b = 0.11, SE = 0.05, $p = 0.04$; relationship outcome: b = 0.17, SE = 0.05, $p < 0.001$) and the control (problem outcome:

[2] Since 31% of the sample did not have a romantic partner, we repeated the analyses examining how sharing partner type was associated with problem and relationship outcomes separately for those (a) in a relationship and (b) not in a relationship. The ranking of estimated problem outcome associated with different types of sharing partners for those (a) in relationship (friend > co-worker > family > acquaintance/stranger > partner) and (b) not in relationship (friend > co-worker > family > acquaintance/stranger) matched what was found in the full sample. The ranking of estimated relationship outcome associated with different types of sharing partners for those (a) in a relationship (friend > family > co-worker > partner > acquaintance/stranger) matched what was found in the full sample, though friend and family member showed a switched rank order for estimated relationship outcome and (b) not in a relationship (family > friend > co-worker > acquaintance/stranger) relative to what is found in the full sample. Findings suggest that the ranking of problem and relationship outcomes for various types of sharing partners remained largely consistent regardless of whether someone had a romantic partner.

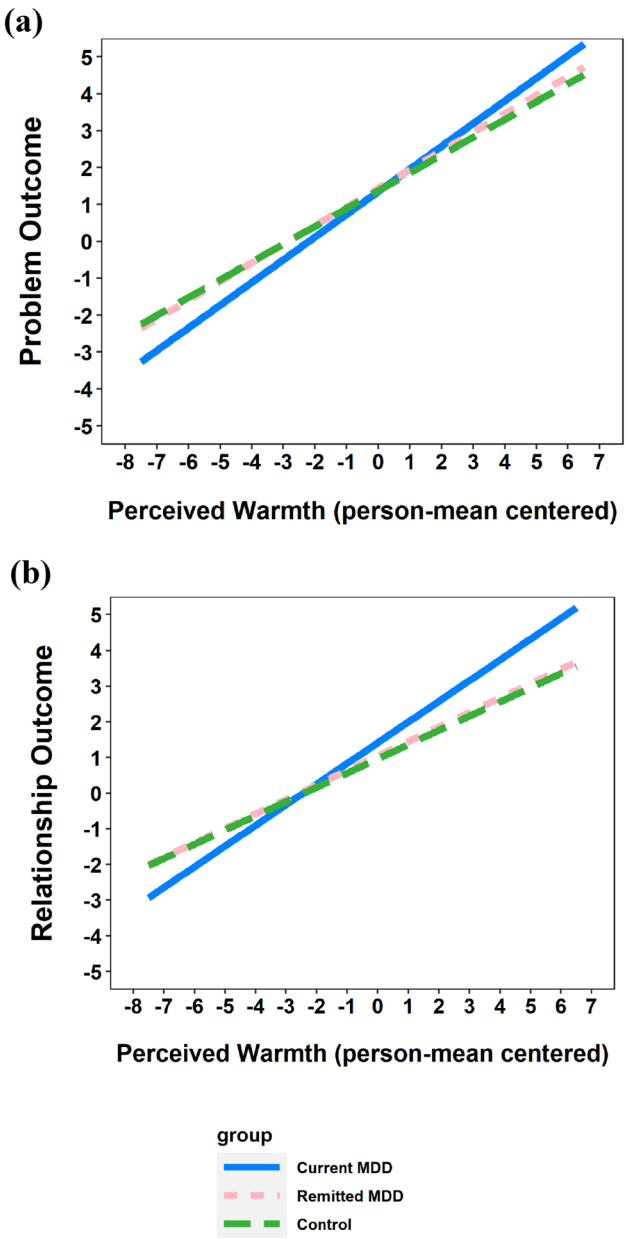

Fig. 1 Within-person associations between sharing partner's perceived warmth and interpersonal emotion regulation outcomes

b = 0.13, SE = 0.05, $p = 0.01$; relationship outcome: b = 0.18, SE = 0.04, $p < 0.001$) groups (Fig. 1). The remitted-MDD group did not differ from the control group, $ps > 0.60$.

At the between-person level, participants who on average perceived their sharing partners as warmer reported better problem and relationship outcomes. Additionally, the association between perceived sharing partner's warmth and problem outcome was significantly stronger for the current-MDD (b = 0.32, SE = 0.11, $p = 0.004$) and remitted-MDD (b = 0.22, SE = 0.10, $p = 0.03$) groups than for the control group; the two MDDs groups did not differ in this association, $p = 0.37$. Further, the association between mean sharing partner warmth and relationship outcome was significantly stronger for the current-MDD group than for the control group (b = 0.26, SE = 0.12, $p = 0.03$), with the remitted-MDD group falling non-significantly between the current-MDD ($p = 0.74$) and control ($p = 0.06$) groups.

Discussion

There is an increasing effort to understand the IER process. We sought to clarify which factors predict the initiation of intrinsic IER as well as the individual- and interpersonal-level outcomes of IER. For intrinsic IER, we identified both subjective emotional experiences and situational characteristics associated with initiating intrinsic IER. For outcomes of the IER process, we found that certain characteristics of the sharing partner were associated with IER problem and relationship outcomes.

Motivational factors for intrinsic IER

The two situational characteristics–event unpleasantness and goal interruption–were the most robust predictors of engagement in intrinsic IER. In situations that were more unpleasant and where a goal was interrupted, individuals were more likely to initiate intrinsic IER via social sharing. These findings support our expectation that people would be more motivated to seek others' help to regulate emotions that arise from unpleasant and unexpected events (Heckhausen et al., 2010; Rimé, 2009). When goals are interrupted, individuals may be motivated to regulate emotion through sharing what had occurred for a variety of reasons (e.g., receive feedback on pursuit of goals). Furthermore, experiencing more frequent goal interruptions on average was associated with being more likely to engage in IER in daily life, suggesting that the link between goal interruption and motivation to engage in IER generalizes to between-person processes. These findings highlight the importance of situational factors implicated in initiating IER in daily life.

Contrary to our expectations, subjective emotional experiences (i.e., NA, PA, attention to emotion, and emotional clarity) were not significant predictors of engaging in IER when accounting for situational characteristics. Research on adult samples has shown that people engage in social sharing when experiencing NA (Heiy & Cheavens, 2014) and that negative emotions motivate social sharing and social communication (Rimé, 2009; Rimé et al., 2020). However, our findings suggest that features of the situation might be more relevant to people deciding to

seek others for support in regulating emotions. Of note, however, with regard to individual differences, in addition to experiencing more goal interruption on average, experiencing higher NA in general was also associated with a greater likelihood of engaging in IER. Because the present study only examined IER interactions that involved sharing negative experiences, further research is needed to examine the role of PA and NA in initiating intrinsic IER following a positive experience (e.g., capitalization; Gable et al., 2004; Hovasapian & Levine, 2018; Lambert et al., 2013). We suspect that PA is more central to engaging in intrinsic IER when sharing positive experiences and possible in youth samples as dysregulated PA is predictive of psychopathology earlier in life (Gilbert, 2006; Vogel et al., 2023).

Although we anticipated that how subjective emotional experiences and situation characteristics were associated with the initiation of IER would differ for individuals with or without MDD (albeit uncertain about directions of moderating effects of MDD), we did not find evidence for this. Instead, our results suggest that factors associated with the initiation of IER are similar regardless of people's MDD status, at least with regard to the predictors we examined and in the context of IER initiated via sharing negative emotional experiences. Our results contribute to research finding that individuals with MDD did not differ in the frequency of IER compared to controls (Liu et al., 2021). Despite our findings, it remains unclear whether those with MDD function optimally during the initiation stage of IER, as they likely have different IER needs considering the elevated NA, diminished PA, and emotion regulation difficulties that characterize MDD (e.g., Houben et al., 2015).

Factors that contribute to the outcomes of IER

People experience different lIER outcomes depending on the type of relationship they have with their sharing partner and the outcome being considered. Sharers tended to have better problem outcomes when engaging in IER with a co-worker or friend than with a romantic partner. Interactions with colleagues and acquaintances may be more practical in nature and sought out based on their knowledge and familiarity with the situation (e.g., speaking with a colleague about stress at work). We found it surprising that romantic partners did not rise to the top for problem outcome, despite most participants being in romantic couples and that adults often rely on romantic partners for support (Gariepy et al., 2016). One reason may be that negative emotional experiences shared with one's romantic partner may be systematically different compared to those shared with other people. In terms of relationship outcomes, people tended to report better outcomes when engaging in IER with a family member, friend, or romantic partner than with a co-worker, acquaintance, or stranger, as expected. This pattern of findings is consistent with research suggesting that relational closeness is often prioritized to a greater extent in close than in non-close relationships (Gable & Reis, 2010).

People's average tendencies to seek various kinds of relationships for IER were not related to IER outcomes. This may reflect the possibility that people turn to different relationships for emotion regulation help that varies in the nature and complexity of the situation, goals one hopes to achieve, and time and effort needed to reach one's IER goals. Thus, it may not be the nature of the relationship type per se but other relationship characteristics and IER interaction that takes place in distinct relationships that contribute to varying outcomes. Future research may test these speculations by closely examining the type of problem that sharers are having when initiating IER and how IER interactions unfold across different relationships.

Sharing partners' warmth was associated with better problem and relationship outcomes at the within- and between-person levels. That is, on occasions of having a sharing partner who is warmer than one typical encounters, the sharer reported greater improvements in how they felt about the problem and how close they felt to the sharing partner. Additionally, problem and relationship outcomes were better when one's sharing partners were warmer on average. These findings align with research examining the link between warmth and closeness in interpersonal relationships (Howe et al., 2001; Williams & Bartlett, 2015), where warmth may convey a sense of attentiveness, care, and thoughtfulness during the IER interaction that is important for how the sharer views their situation and relationship with their sharing partner. Researchers have examined mutual expressions of warmth and care at the group-level. For example, positivity resonance theory focuses on shared positive affect and mutually expressed warmth and care in dyadic or group-level interactions (Fredrickson, 2016). It will be important to examine ways to encourage individuals to cultivate warmth in their interactions, including during IER interaction, and how this might benefit all individuals in the exchange.

We also found that the associations between sharing partner's warmth and IER outcomes varied based on participants' MDD status at both momentary- and person-levels. At the momentary level, compared to healthy controls or those with remitted MDD, those with current MDD benefited more from engaging in IER with a sharing partner that was warmer than their typical encounter. Similarly, at the between-personal level, experiencing one's network of sharing partners as having higher levels of warmth on average was more strongly associated with positive problem and relationship outcomes among those with current MDD than healthy controls. These findings highlighted the important role of interpersonal warmth in providing effective

IER support to those currently suffering with MDD and is good information for providers and loved ones of those with MDD. Our findings build upon research that has primarily examined warmth as protective for psychological adjustment in parent–child relationships and family environments (Butler et al., 2019; McLeod et al., 2007). Warmth from others might also be particularly necessary and beneficial for adults with MDD, as individuals with elevated depression tend to be more self-critical and struggle in providing themselves with reassurance and warmth (Gilbert et al., 2006). The MDD findings generally suggest that what predicts the likelihood of engaging in IER and its outcomes may be more similar than different across people with and without MDD, pointing to aspects of the emotion regulation process that are not associated with current or past experiences of MDD.

While our study clarifies portions of the IER process, we note a few limitations. First, we assessed IER initiated via social sharing of negative emotional experiences, which sets boundaries of the context in which our findings can be interpreted. Future research should examine other forms of IER, including IER that does not involve social sharing (e.g., declining an invitation to a party to avoid anticipated social anxiety) and IER in the context of PA (e.g., capitalization; Gable et al., 2004). In addition, we did not test whether the associations we describe with regard to IER also characterize intrapersonal emotion regulation. Consequently, we do not know the specificity of the findings. Although we focused on initiation of IER given the lack of knowledge around motives to engage in IER, there may be interesting distinctions in what motivates individuals to engage in intrapersonal versus IER, as desired emotional states might impact whether an individual pursues regulation on their own or with others.

Although we assessed warmth, there are other dimensions of the IER interaction that are likely critical to IER outcomes. For example, synchronous interactions are linked to greater feelings of affiliation (Hove & Risen, 2009), which might be particularly relevant for relational outcomes. Other dimensions might predict who and when an individual might seek a particular sharing partner. For example, when experiencing a discrimination stressor, an individual might seek a sharing partner who might have shared a similar experience, whereas when experiencing an academic stressor, an individual might reach out to a classmate.

Beyond these, another limitation is that we did not assess the sharing partners' perspectives. Research has found that sharing partners sometimes feel increased NA when the sharer expresses NA (Nils & Rimé, 2012; Rimé, 2009). Feeling worse may come from the effort or stress resulting from helping others or from the impact of the strategies they choose to help regulate the sharer's emotions (e.g., burnout; Gurera, 2022; Rauers & Riediger, 2023; Zaki, 2020). Finally, although our sample was racially/ethnically representative of the geographic location in which the study was conducted, it underrepresented several groups according to national averages. It will be important that future research includes a sample that is more representative to the US and other countries to increase the generalizability of findings.

Overall, the current research builds on existing research linking IER tendency and efficacy with well-being (William et al., 2018) by clarifying what predicts the initiation and outcomes of IER in everyday life. Our findings highlighted several emotional, situational, and interpersonal factors that influence the IER process, using methods with high ecological validity and a clinically diverse sample. By taking a multilevel approach, we also distinguished factors that predict IER at the momentary versus person level, contributing to a nuanced understanding of the initiation and outcomes of everyday IER.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11031-024-10089-8.

Declarations

Conflict of interest We have no conflicts of interest to disclose.

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