

(When) shall we talk: Mental depletion linked to decreased empathic accuracy in daily interactions between romantic couples

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Abstract

Empathic accuracy (EA), the ability to accurately infer others' thoughts and feelings, is critical for fruitful empathic exchanges in intimate relationships. Most EA research was limited in their real-life validity and actor-partner considerations. Since reduced mental resources have been linked to decreased judgment accuracy and reduced emotional expressions, we predicted that both actor's and partner's mental depletion would be associated with lower EA towards partners' relationship appraisals and moods. We also investigated moderation by valence of mood and by gender. Additional analyses tested the presence of anchoring and how it related to mental depletion and EA. Eighty-seven heterosexual couples in Hong Kong ($N = 174$, $M_{\text{age}} = 28.81$) contributed baseline data and diary data over two weeks (totaling 2416 diary data points). Data were analyzed with the Actor-Partner Interdependence Model. Self and partner's mental depletion was associated with decreased EA. The associations were stronger in EA for negative moods and in men's EA for partner's positive moods. Anchoring was present in the sample and correlated with higher EA but less mental depletion. Results offer insights into daily variations in EA and the dual process model of social cognition, and have implications for optimal communication timing.

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Introduction

Empathy, the ability to understand and share others' emotions, is vital in social relationships (Zahn-Waxler & Radke-Yarrow, 1990). Empathic accuracy (EA), an aspect of cognitive empathy, refers specifically to the extent to which attempts to infer others' thoughts and feelings are accurate (i.e., not merely attempting to do so) (Ickes, 2009; Ickes & Hodges, 2013). EA is crucial for effective communication and mutual understanding between romantic partners. Accurate inferences of partner's thoughts or feelings have been linked to higher relationship satisfaction in both parties within a relationship (Sened, Lavidor, et al., 2017) because accurate perceivers manage relational risks better (Murray et al., 2006) and show increased responsiveness toward the target (Howland, 2016; Lazarus et al., 2018).

Given its importance in relationship functioning, identifying the influencing factors of EA is vital. Early studies showed that EA is unaffected by individual differences in the perceiver's personalities or intelligence, but it is often affected by external, motivational factors, such as monetary incentives (Klein & Hodges, 2001) and cues of gender roles (Ickes & Hodges, 2013). For instance, Thomas and Maio (2008) found that priming the importance of empathic capability and its traditional association with women motivated female participants to demonstrate higher accuracy. Recent research further showed that EA is sensitive to transient, situational factors. For instance, acute stress affects people's EA towards strangers and romantic partners (Crenshaw et al., 2019; Nitschke et al., 2022). Not only could stimuli directed to the perceiver impact their EA, but the target's characteristics also play a role in the information deciphering process. For example, the target's readability—often operationalized as how expressive the target is—has been shown to be a solid predictor of EA: the difficult-to-read targets induce lower EA performance across perceivers (Ickes & Hodges, 2013; Thomas & Maio, 2008; Zaki et al., 2008, 2009). In a related term, the target's social sharing tendency is associated with higher accuracy in the partner's perception of a range of emotions (Kotiuga et al., 2025). Investigations on situational and dyadic precursors of EA are especially important in the context of romantic relationships, as intensive and continuous interactions are essential components in people's intimate relationships. Hence, the current paper proposes mental depletion as a factor affecting romantic couples' EA in everyday interactions.

Most EA research is laboratory-based, with limited use of the diary method. While laboratory-based studies have provided many insights and are easier to standardize and control, the diary method is more ecologically valid (e.g., Gadassi et al., 2011; Kotiuga et al., 2025; Rafaeli et al., 2017). The diary method is especially useful when the intention is to capture the daily fluctuations in psychological constructs. Addressing daily variations in EA is not only of theoretical relevance but also of practical relevance. People may expect the partner to be empathic at any time and/or to be empathic at a stable level,

thus exerting little consideration on the optimal timing for empathic communication. Overlooking daily fluctuations in empathy and ignorance about conditions that co-occur with higher or lower empathy may hinder fruitful empathic exchanges. For example, when either the actor or the partner feels mentally depleted, EA towards the other party may be low, and empathic exchanges could be impaired. To address these research gaps, we conceptualized mental depletion as linked to EA and investigated their associations with a diary procedure.

Mental depletion as a predictor of (lower) EA in romantic relationships

Previous research has shown that EA is reduced when factors associated with disturbed cognitive functioning (e.g., stress, depression) are present. For example, [Crenshaw et al. \(2019\)](#) found acute stress was linked to decreased EA, and the authors argued it might be because that EA relied heavily on the self-regulation systems and the functioning of associated brain structures (e.g., prefrontal cortex) was sensitive to stress ([Arnsten, 2009](#)). For depressed individuals, altered cognitive functioning make them more prone to biased perceptions and negative interpretations of social information ([Gadassi et al., 2011](#)). This paper proposes mental depletion as a cognitive factor that might be linked to reduced EA in everyday life.

Mental depletion, or mental fatigue, refers to a state of temporary reduction in volitional capacity (e.g., initiative, choice, self-regulation) ([Baumeister & Vohs, 2016](#)). It is a cognitive state that people could frequently experience in day-to-day life. Common life challenges like long working hours ([Akerstedt et al., 2002](#)), sleep deprivation ([Kayser et al., 2022](#)), and social movements ([Tadmor et al., 2018](#)) bring mental depletion. Given its high prevalence in adults (20.4%, [Yoon et al., 2023](#)), burgeoning research has examined how mental fatigue harms work efficiency ([Ricci et al., 2007](#)) and health ([Galland-Decker et al., 2019](#)), but its role in social life and intimate relationships remains understudied.

Actor's mental depletion. The cognitive nature of EA ([Ickes, 2009](#)) means it requires mental resources, so mental depletion is likely to negatively relate to one's EA. In the default-interventionist dual-processing model ([Evans & Stanovich, 2013](#)), cognition involves two information processing systems—the quick, intuitive reflexive system costing little cognitive resources, and the slow reflective system heavily relying on executive resources. In reflexive processes (type-1 processes), people tend to make judgments based on stereotypes and prior knowledge; while reflective processes (type-2 processes) involve more deliberate analysis of situational information ([Tadmor et al., 2018](#)).

Comparably, accumulating evidence from neuroscientific and behavioral research has demonstrated a dual-process account for empathic inferences ([Ma-Kellams & Lerner, 2016](#); [Sened et al., 2020](#); [Shamay-Tsoory, 2011](#); [Zaki & Ochsner, 2011](#)). Empathic accuracy inferences could be achieved through two sources: assumed similarity (the extent to which perceivers' judgements are associated with their own feelings or emotions) and direct accuracy (the extent to which perceivers' judgements are associated with the targets' feelings or emotions after controlling for assumed similarity). [Sened et al.](#)

(2020) proposed a framework connecting the two components in EA inferences with the two cognitive processes (type-1 vs. type-2 processes) and different brain areas responsible for emotional and cognitive empathy. This framework is also in line with the anchoring-and-adjustment series in social judgment, where the perceiver uses self-knowledge or opinions as a starting point (e.g., using own emotions as an initial cue to predict similar emotions in a partner) and then makes a series of adjustments based on available information about the target and contextual cues (Tamir & Mitchell, 2013; Tversky & Kahneman, 1974). Making judgments based on target's information (direct accuracy) and adjusting from the anchor—both reflecting type-2 processing—take longer time (Sened et al., 2020; Tamir & Mitchell, 2013). Meanwhile, Ma-Kellams and Lerner (2016) showed through four experiments that, when encouraged to think intuitively, participants were less accurate in their judgement. In other words, empathic accuracy relied more on reflective processing than intuitive processing. Given that mental depletion weakens the inhibition of intuitive, reflexive processing (Baumeister & Vohs, 2016) and that depleted individuals demand cognitive closure—a desire for cognitive clarity and certainty which reduces their motivation for empathizing and judgement tasks (Kruglanski & Webster, 1996), we hypothesized that depleted individuals would be less accurate in empathic inferences.

The relationship between mental depletion and specific strategies to achieve empathic accuracy, such as anchoring, is less clear. Anchoring may be a type 1 (fast, intuitive heuristic reflecting only assumed similarity; e.g., assuming partner feels the same way as one feels) or become a type 2 process (elaborate, reflective strategy that achieves direct similarity) depending on whether there is sufficient adjustment (Sened et al., 2020; Tamir & Mitchell, 2013; Tversky & Kahneman, 1974).

Partner's mental depletion. The process of reaching empathic accuracy is dyadic in nature. One's EA could also be influenced by their partner's mental depletion level. As noted earlier, target's readability, as represented by their expressiveness, is an important influencing factor on perceiver's EA performance (Thomas & Maio, 2008; Zaki et al., 2008). Clinical research has shown that mentally depleted people are less emotionally expressive (Rimes et al., 2016) and they tend to veil their internal mental states by more positive outward expressions (Hambrook et al., 2011). In other words, when a partner feels mentally depleted, they give away less and yet more misleading information during interactions, reducing the perceiver's chance to accurately read them.

Mood valence

The strength of links between mental depletion and EA may differ when perceivers are reading different content. Prior literature has shown that associations between EA and its impact factors are often valence-specific (i.e., positive or negative moods). For example, depression was associated with lower EA for negative, but not positive, feelings (Gadassi et al., 2011), because depressed individuals' hypersensitivity to negative interpersonal information led to inaccurate judgment. In the current study, the harmful effects of mental depletion are likely to be stronger on EA for negative moods. From the perceiver's side,

experiments have shown that laboratory-induced mental depletion results in avoidant attentional bias towards negative emotional stimuli in healthy individuals (Watanabe et al., 2019). According to the process model proposed by Gross (1998), two important processes involved in emotion regulation are attentional deployment and response modulation. It is possibly because when cognitive resources become insufficient for top-down regulation of negative emotions, people deliberately pay less attention to negative stimuli and shift to the coping mode of avoidance (Ochsner & Gross, 2005). On the target's side, clinically fatigued patients have been observed to suppress the expression of their negative emotions (Rimes et al., 2016). Cameron and Overall (2018) found a similar association between suppression of negative emotions and mental fatigue in romantic couples across several diary studies. Thus, the decrease in targets' readability brought by mental depletion may be especially evident when it comes to negative moods.

Gender

Empathy relevant capabilities have long been tied with women (Ickes et al., 2000), and heterosexual relationships is an institution where gender roles are made pronounced and are constantly reinforced (Deaux & Major, 1987). Thus, it is worth investigation what dynamics gender would bring to the relationship between mental depletion and EA. It has also been empirically documented that the same factor could differentially affect women's and men's EA, although the directions of differences have been mixed. For example, women's but not men's depressive symptoms were associated with lower EA (Gadassi et al., 2011). Crenshaw et al. (2019) found acute stress impaired women but not men's EA, but in Nitschke et al. (2022), acute stress boosted men's but not women's EA. Thus, gender may also matter in the link between mental depletion and EA. Consistent with the social role theory (Eagly, 1987), women are expected to be more empathic (Ickes et al., 2000) and to be social facilitators in relationships (Eagly & Wood, 1991). These expectations may both burden them and motivate them to be understanding even when they or their partner are mentally depleted. Meanwhile, women tend to be more expressive (Fischer & LaFrance, 2015), so to the extent that men rely on their female partner's expressions and women's depletion reduces their expressions, men's EA may be more affected by their female partner's mental depletion.

Daily diary method

We used the daily diary method to address the relationship between mental depletion and EA. Most EA research is laboratory-based and there is limited use of the diary method, the latter of which can complement laboratory findings with its high ecological validity (e.g., Gadassi et al., 2011; Rfaeli et al., 2017). The diary method enables researchers to conduct experience sampling and observe how naturally induced mental depletion brings fluctuations in romantic couples' EA. Addressing daily variations in EA is also of practical relevance. People may naively assume the partner has a stable level of EA and ignore fluctuations in EA as well as the conditions that co-occur with higher or lower empathy. Such ignorance could hinder fruitful empathic exchanges between romantic partners. By

revealing the daily fluctuations in EA and its associated factors, the diary method makes the study results more straightforward for application to real life.

This study

We examined the relations between mental depletion and EA using dyadic diary data. We theorized that on days when participants felt mentally depleted, EA would be low. Specifically, we investigated people's EA towards romantic partners' relationship appraisals and moods. We defined relationship appraisals as individuals' evaluations of the quality and satisfaction of their romantic relationship. In addition to the general moods normally included in previous research, we included this aspect of relationship-specific contents as it might provide additional insights into how EA would affect relationship outcomes.

We hypothesized that perceiver's mental depletion would negatively relate to their own EA (*H1a*) due to increased judgmental bias and need for cognitive closure (Kruglanski & Webster, 1996; Tadmor et al., 2018). Target's mental depletion would negatively relate to perceiver's EA (*H1b*) since mental depletion likely reduces target's readability (Hambrook et al., 2011; Rimes et al., 2016). As mentally exhausted people tend to suppress and avoid negative emotions as a way of emotion regulation (Cameron & Overall, 2018; Rimes et al., 2016; Watanabe et al., 2019), mental depletion would relate more strongly with EA for negative (vs. positive) moods (*H2*). Given gender stereotypes about empathy (Ickes et al., 2000), social roles (Eagly & Wood, 1991), and expressivity (Fischer & LaFrance, 2015), the link between men's EA and their female partner's mental depletion would be strongest (*H3*). Although this study was not initially designed to test anchoring, upon the suggestion of a reviewer to explore anchoring, we conducted additional analyses to test for the presence of anchoring and analysed two associations, that between anchoring and EA and that between mental depletion and anchoring. We predicted that anchoring would be present as indicated by positive correlations of actor's own moods and relationship appraisals with their judgments of partner's moods and relationship appraisals (*H4a*). We also predicted that anchoring would be significantly correlated with EA (*H4b*) and mental depletion (*H4c*). However, given that anchoring could be an effective strategy for EA and that whether it is a type 1 or type 2 process (as in the dual process model) may depend on the amount of adjustments, we did not have specific directional hypotheses (i.e., positively or negatively correlated) for these two associations.

Our focus was on the daily diary data, which are more ecological and sensitive to variations. For robustness checks, we also aggregated individual diary data to form person-level data to check generalizability to a longer time frame. Additionally, we re-ran analyses controlling for baseline data on general empathy and relationship quality, age, and relationship length.

Method

Participants

Heterosexual couples (18–40 years) were recruited through social media, university mass emails, and snowballing. Both partners were required to be in Hong Kong during their participation to eliminate the effect of geographical separation.

The sample size was determined by referencing prior studies using similar data collection methods and analytical strategies (Gadassi et al., 2011; Rafaeli et al., 2017). These studies included 51 to 80 couples for analyses after excluding 5.3%–9% of invalid cases of the original samples. Thus, we aimed to recruit at least 70 heterosexual couples and ended up with 95 couples. Of the 95 couples, seven were excluded for insufficient diary data, and another was excluded because one member of the couple identified as gender non-binary. Final analyses included 87 couples (91.6%, $N = 174$; see Table 1 for demographic information).

Of the 174 participants ($M_{age} = 28.81$, $SD = 5.03$), 170 (97.7%) participants were heterosexual people, two (1.1%) were bisexual people and two (1.1%) were pansexual people. They were all in a heterosexual relationship at the time of participation. Over half of the participants (55.6%) were in cohabitation and 23% were married. The average relationship length was 5.26 years ($SD = 4.61$). Most participants (97.7%) were in a committed relationship. Before the current one, participants had an average of 1.59 romantic relationships ($SD = 1.63$).

Forty-six (26.4%) participants were students, and the rest came from a range of occupational fields. The median monthly income was HKD20,000–24,999 (~USD2557–3196). Most participants (97.1%) received post-secondary education. Most participants (97.7%) were Chinese, two (1.1%) were Filipino, one (0.6%) was Japanese, and one (0.6%) was Latino. Such demographic information suggested that the sample was reasonably diverse and of typical socioeconomic status.

Procedures

There were two survey assessment sessions, the baseline assessment and the daily assessment. All existing English scales were translated into Chinese by the authors and research assistants, all fluent in Chinese and English. Relevant study materials can be found in Study Materials (<https://osf.io/gw678/files>).

After initial screening, eligible participants received the baseline survey link. Participants provided their informed consent to participate in the two assessments before filling in the baseline survey. They were told that the purpose of the study was to learn about people's accuracy in understanding romantic partner's feelings and thoughts. They were also told the specific procedures detailed below. In the baseline assessment, participants completed questionnaires on relationship quality, empathy quotient, demographics, and questions regarding their current romantic relationship.

In the daily assessments, participants filled out the daily survey for two weeks (14 days). They reported their mental depletion level, feelings towards their relationship, and moods of the day. Besides, they rated their partner's relationship appraisals and moods of the day based on their own observations. Survey links were sent to participants via email, WhatsApp, or WeChat at 8 p.m., and expired at 6 a.m. the next morning. Participants were required to independently complete the survey before bed, and they were asked not to discuss their answers with the partner. The days when both partners completed the questionnaire were counted as valid days. If either partner had missed a day, the test period for both partners was extended by a day until they made up for 14 valid

Table 1. Sociodemographic characteristics of participants.

	<i>n</i> (<i>N</i> = 174)	Percentage (%)
Gender		
Female	87	50
Male	87	50
Sexual orientation		
Heterosexual	170	97.7
Bisexual	2	1.1
Pansexual	2	1.1
Relationship status		
Casual dating	3	1.7
Committed and unmarried	130	74.7
Committed and married	40	23.0
Polyamory	1	0.6
Number of previous romantic relationships		
0, 1, 2	137	78.7
3, 4, 5	33	19.0
6 and above	4	2.3
Marital status		
Never married	132	75.9
Married	40	23.0
Divorced/widowed	2	1.1
Children		
Yes	14	8.0
No	160	92.0
Number of children		
Zero	160	92.0
One	6	3.4
Two	8	4.6
Cohabiting		
Yes	95	54.6
No	79	45.4
Highest educational level		
Senior secondary school	5	2.9
Post-secondary (diploma/certificate; sub-degree course; degree course)	99	56.9
Postgraduate degree	70	40.2
Job industry		
Student	46	26.4
Public administration, education, human health, and social work activities	60	34.5
Finance and insurance	17	9.8

(continued)

Table 1. (continued)

	<i>n</i> (<i>N</i> = 174)	Percentage (%)
IT and communication	11	6.3
Construction and manufacturing	12	6.9
Real estate, professional and business services	6	3.4
Transportation, import/export trades	4	2.3
Others	18	10.3
Monthly income (USD)		
<1023	32	18.4
1023–1918	12	6.9
1918–2557	28	16.1
2557–3196	22	12.6
3196–3836	17	9.8
3836–5115	30	17.2
5115–7672	24	13.8
≥7672	9	5.2
Subjective socioeconomic status		
1–3	17	9.8
4–7	144	82.7
8–10	13	7.5
Ethnicity		
Chinese	170	97.7
Non-Chinese Eastern Asian	3	1.7
Other	1	0.6

days or until the test period was 20 days long. Participants should finish at least 10 valid daily surveys to be included in the analyses. In the final sample, 83 couples finished 14 valid days, and the remaining four couples finished 10, 11, 12, and 13 valid days, respectively. Each participant received an EA performance report and up to ~USD45 compensation for completing all the assessments.

Measures

Baseline measures

Relationship quality. The 18-item Perceived Relationship Quality Components Inventory (Fletcher et al., 2000) was used to measure participants' perception of relationship quality. The inventory assesses six aspects of romantic relationships, namely relationship satisfaction, commitment, intimacy, trust, passion, and love. Sample items include "I am satisfied with my relationship." and "I can count on my partner." Participants responded on a seven-point Likert scale to what extent they agreed with the statements (1 = *Strongly*

disagree and 7 = *Strongly agree*). Scores were summed, and higher scores indicated higher relationship quality ($\alpha = .95$).

Empathy quotient. The ten-item short form of the Empathy Quotient Scale (Greenberg et al., 2018) was used to measure participants' general empathy. It reflects people's general empathy (both cognitive and affective) level but does not objectively measure the accuracy level of people's empathy. Sample items include "I am good at predicting how someone will feel." and "I can't always see why someone should have felt offended by a remark." Participants rated how strongly they agreed with these statements (*Strongly agree* to *Strongly disagree*). Responses were scored as originally instructed, with higher scores reflecting higher empathy ($\alpha = .84$).

Demographics. Basic demographic information such as participants' gender, age, and educational attainment, and questions about their current relationship, such as relationship length, were asked.

Daily measures

Mental depletion. An adapted 15-item version of the Perceived Depletion Scale (Tadmor et al., 2018) was used to measure participants' perceived availability of mental resources. Sample items of the adapted scale include "I felt it was hard to control myself." and "I felt emotionally exhausted." Participants responded on a seven-point Likert scale (1 = *Very untrue of me* and 7 = *Very true of me*) regarding how they felt during the day. Item 9 and item 10 were reversely coded, then all item scores were summed. Higher scores indicated higher mental depletion ($\alpha = .94$). We did not follow Cranford et al. (2006) to calculate two reliability coefficients (within- and between-subject) for daily data. This method requires all participants to be assessed during the same period of time (e.g., on the same day), but our study recruited participants in three batches. Thus, Cronbach's alpha was used as the reliability index for daily measures.

Relationship appraisals. A six-item short form of the Perceived Relationship Quality Components Inventory (Fletcher et al., 2000) was used to measure participants' appraisals of their relationship of the day. The instruction for reporting one's own feelings was "Please indicate how you felt about your relationship today." Participants responded to statements (e.g., "Today, I trusted my partner.") on a seven-point Likert scale (1 = *Very untrue of me* and 7 = *Very true of me*, $\alpha = .92$).

To rate the partner's feelings, the instruction was "Please indicate how you think your partner felt about your relationship today." Items were the same as those about one's own feelings except for minor modifications of pronouns (e.g., "Today, *my partner* trusted *me*"). Participants responded on a seven-point Likert scale (1 = *Very untrue of what I believe* and 7 = *Very true of what I believe*, $\alpha = .92$).

Moods. Following Gadassi et al. (2011), 18 items were selected from the Profile of Mood States (McNair et al., 1981) to measure three positive moods (calm, happiness, and vigor) and three negative moods (anger, anxiety, and depression), with three items for

each mood. Participants responded to the statements (e.g., “Today, I felt happy.”) on a seven-point Likert scale (1 = *Very untrue of me* and 7 = *Very true of me*). Reliabilities for positive moods and negative moods were .94 and .93, respectively.

The instruction for rating partners’ moods was similar to that in the Relationship appraisals section ($\alpha_{\text{rating partners' positive moods}} = .94$ and $\alpha_{\text{rating partners' negative moods}} = .94$).

Analytic approach

A total of 2416 daily reports from 87 couples were collected. There was no missing data because forced response was set to ensure participants answered every question in all surveys.

Computation of EA. EA in daily diary studies is often operationalized as the sum of absolute differences between the perceiver’s judgment and the target’s self-rating on each item of a psychological construct (Gadassi et al., 2011; Howland & Rafaeli, 2010; Rafaeli et al., 2017), and we adopted this approach. We did not use the correlational approach to operationalize EA, such as tracking accuracy in the Truth-and-Bias model (West & Kenny, 2011) for several reasons. First, the difference score approach has been a well-received way of operationalizing EA particularly when examining associations between EA and other variables (e.g., Gadassi et al., 2011; Howland & Rafaeli, 2010; Rafaeli et al., 2017). Second, while the correlational approach addresses co-variability in self-ratings and perceivers’ judgments and differentiates the information sources of judgments (e.g., sad actors see partners as sad; see Sened, Yovel, et al., 2017 for an example), it does not tell how far the perceiver’s judgment is from the target’s thinking and feelings (e.g., the correlation can be high despite large discrepancy between perceiver’s and target’s ratings). Moreover, it does not provide an EA performance score for each observation or judgment, making it impossible to investigate how EA covaries with another variable. Our conceptualization of EA was based on an interest in the degree of congruence between the target’s self-ratings and the perceiver’s judgments, and whether mental depletion was associated with the congruence between the ratings.

Using the difference score approach, three EA variables were computed for each participant: one for relationship appraisals, one for positive moods, and one for negative moods. The three EA variables demonstrated good internal reliability: $\alpha_{\text{EA for relationship appraisals}} = .83$, $\alpha_{\text{EA for positive moods}} = .83$, $\alpha_{\text{EA for negative moods}} = .84$. The variable scores were reversed so that higher scores indicated greater accuracy.

Computation of anchoring. Anchoring was examined in two ways. The presence and extent of anchoring was indicated by how self-reported relationship appraisals and moods correlated with predictions of partner’s relationship appraisals and moods. When studying the associations between anchoring and other variables, at the suggestion of an anonymous reviewer, we conceptualized anchoring as the sum of absolute differences between the perceiver’s self-rating and the perceiver’s judgement on each item of a psychological construct. We computed three anchoring scores using this difference score approach: one for relationship appraisals, one for positive moods, and one for negative moods. The three

anchoring variables demonstrated good internal reliability: α_{Anchor} for relationship appraisals = .73, α_{Anchor} for positive moods = .87, α_{Anchor} for negative moods = .83. The variable scores were reversed so that higher scores indicated greater anchoring tendency when making judgements.

Preliminary analyses. We first explored descriptive results, zero-order correlations of the key variables and demographic variables. Differences between men and women were also analyzed.

Main analyses: Actor-Partner Interdependence Model (APIM) (H1-H3). To address the non-independence of the dyadic, repeatedly measured data, the Actor-Partner Interdependence Model (APIM; Kashy & Kenny, 2000) was used to examine the relations between mental depletion and EA. APIM enables simultaneous estimations of *actor effects* (e.g., the effects of *women's* mental depletion on *women's* EA) and *partner effects* (e.g., the effects of *men's* mental depletion on *women's* EA). Figure 1 provides a conceptual illustration of the APIM model. APIM models were run for the three EA variables separately. Using the *nlme* and *Dyadr* package (Garcia, 2018) in R, all APIM models were first run with the one-intercept approach, with gender as a moderator. If any significant interactions were observed, we re-ran the models with the two-intercept approach to obtain separate coefficient estimations for women and men (Kenny & Kashy, 2010).

Daily level. Research questions concerning the daily variabilities of study variables (Figure 2 shows the daily variations in study variables) were addressed mainly with the daily-level data. Our data have three conceptual levels: the daily level, the person level, and the couple level. As noted by Bolger and Laurenceau (2013), due to the limited variability between the person-couple levels, our data have a two-level structure in nature: daily level (Level 1) and person/couple level (Level 2). We tested the APIM models

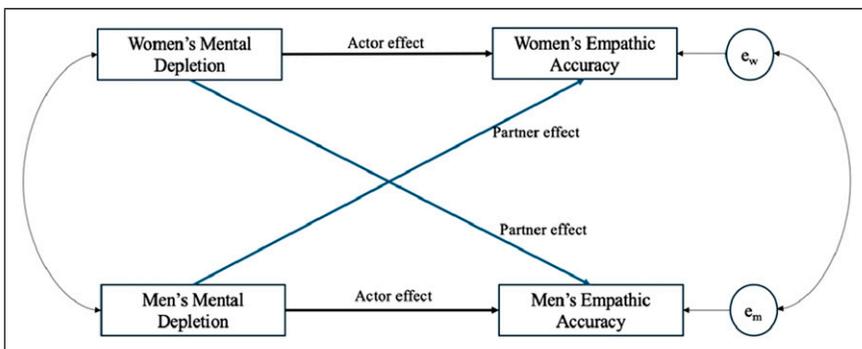


Figure 1. Conceptual illustration of the APIM model predicting empathic accuracy from mental depletion. Double-headed arrows indicate correlated variables/errors. In supplementary analyses where we reported robustness checks of alternative analyses, actor's age, relationship length, general empathy, and baseline relationship quality were added as control variables.

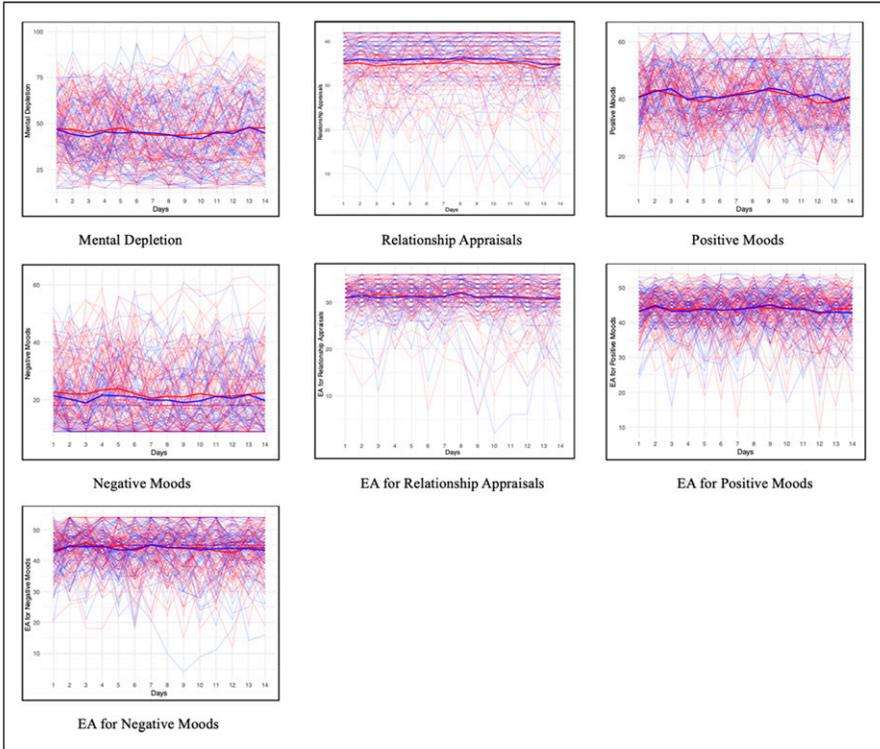


Figure 2. Graphical illustration of the fluctuations of study variables in daily assessment by gender. Red lines represent women participants while blue lines represent men participants. The bolded lines represent the variable means for each gender.

through linear mixed-effects models using the *nlme* package in R. Level 1 independent variables include actor's mental depletion and partner's mental depletion. Following [Rafaelli et al. \(2017\)](#), a lagged score of the dependent variable (i.e., EA on the previous day) was included as a covariate since repeated measures on the same construct are likely to be correlated. This practice provides a more stringent test of the conclusion that same-day mental depletion and EA are related beyond the overall stability in EA across days. We also tested whether the association between EA and the three Level 1 independent variables were moderated by gender. Following common practice in handling daily diary data ([Gadassi et al., 2016](#)), we first included the person-level means for EA, both partners' mental depletion and their interaction terms with gender in the random intercept. Second, we added random slopes of actor's mental depletion and partner's mental depletion at the same time. This model fitted our data only when EA for negative moods was the dependent variable, but it could not converge when EA for relationship appraisals or EA for positive moods was a dependent variable. Then we deleted the term for partner's mental depletion; the model still couldn't converge for EA for positive moods, but it converged

when EA for relationship appraisals was the dependent variable. So, in the end, we specified a simple random intercept model when the dependent variable was EA for positive moods, and the model for EA for relationship appraisal had only actor's mental depletion as the random slope. The equations for the full model are as below:

Level 1 Equation:

$$Y_{ijk} \text{ (EA on day } k \text{ for person } j \text{ in couple } i) = \beta_{0ij} + \beta_{1ij} * (\text{actor's mental depletion on day } k) \\ + \beta_{2ij} * (\text{partner's mental depletion on day } k) \\ + \beta_{3ij} * (\text{actor's lagged EA [day } (k-1)]) + r_{ijk}$$

Level 2 Equation:

$$\beta_{0ij} = \gamma_{00} + \gamma_{01} * \text{Gender} + \gamma_{02} * (\text{actor's mean EA}) \\ + \gamma_{03} * (\text{actor's mean mental depletion}) + \gamma_{04} * (\text{partner's mean mental depletion}) \\ + \gamma_{05} * (\text{actor's mean EA} * \text{Gender}) \\ + \gamma_{06} * (\text{actor's mean mental depletion} * \text{Gender}) \\ + \gamma_{07} * (\text{partner's mean mental depletion} * \text{Gender}) + \mu_0$$

$$\beta_{1ij} = \gamma_{10} + \gamma_{11} * \text{Gender} + \mu_1$$

$$\beta_{2ij} = \gamma_{20} + \gamma_{21} * \text{Gender} + \mu_2$$

$$\beta_{3ij} = \gamma_{30} + \gamma_{31} * \text{Gender}$$

Person level. We also ran the APIM models with aggregated person level data (i.e., daily data averaged for each participant) to see whether the results would extend to a longer time frame. We re-tested the APIM models through generalized least squares (GLS) analyses using the *Dyadr* package (Garcia, 2018) in R. All variables were centered and standardized. Daily level variables were group-centered by person and person level variables were grand-centered.

Supplementary analyses. For additional robustness checks, we re-ran the main analyses described above with baseline covariates. Age and relationship length were entered as covariates because some prior research indicated their links to EA (Rauers et al., 2013; Thomas & Fletcher, 2003). General empathy and relationship quality were also included as covariates for their possible confounding associations with EA. For brevity, we only present results from models without covariates in the main text. Including these covariates did not significantly alter the results unless otherwise noted. APIM results with covariates can be found in Supplementary Analyses Results (<https://osf.io/gw678/files>).

Additional analyses: anchoring and its associations with EA and mental depletion (H4). We examined the presence of anchoring by testing the correlations of actor's own moods and relationship appraisals with their judgments of partner's moods and relationship appraisals. Next, we computed anchoring scores using a difference score approach and examined how the computed anchoring scores correlated with EA and mental depletion by testing their inter correlations at the daily level.

Transparency and openness. We reported how we determined our sample size, all data exclusions, and all relevant measures in the study. Relevant data, codes, and materials can be found at (<https://osf.io/gw678/files>). Data were analyzed using R, version 4.1.2 (R Core Team, 2021) and the package *nlme* and *Dyadr* (Garcia, 2018). This study's design and analyses were not pre-registered.

Results

Descriptive statistics and preliminary analyses

Table 2 and Table 3 present the means, standard deviations, and zero-order correlations for the variables measured or computed at the daily level ($N = 174$ persons; 2416 observations) for all participants and for women and men separately. Table 3 presents basic comparisons between men and women.

During the testing period, participants generally felt satisfied with their relationship on a daily basis ($M = 35.30$, $SD = 5.96$, $Range = 7-42$). They reported more positive moods ($M = 41.22$, $SD = 10.84$, $Range = 7-63$) than negative moods ($M = 21.21$, $SD = 11.42$, $Range = 7-63$), and their average mental depletion score was 45.13 ($SD = 17.93$, $Range = 7-105$). Women felt less satisfied ($t(1207) = -4.91$, $p < .001$, $d = .14$), more mentally depleted ($t(1207) = 1.99$, $p = .047$, $d = .06$) and had more negative moods ($t(1207) = 4.46$, $p < .001$, $d = .13$) than their male partners. The average EA scores were 31.21 for relationship appraisals ($SD = 4.05$, $Range = 0-36$), 43.77 for positive moods ($SD = 6.08$, $Range = 0-54$), and 44.05 for negative moods ($SD = 7.16$, $Range = 0-54$). Paired t -tests showed no gender differences in EA performance—relationship appraisals: $t(1207) = 1.37$, $p = .170$, $d = .04$; positive moods: $t(1207) = .98$, $p = .329$, $d = .03$; negative moods: $t(1207) = .33$, $p = .745$, $d = .01$.

On the baseline measures, age, relationship length, general empathy, and relationship quality are the four covariates of interest. Within a couple, women were younger than their male partners, $t(86) = -3.86$, $p < .001$, $d = .23$; and women reported higher general empathy, $t(86) = 2.82$, $p = .006$, $d = .30$. Women reported lower overall relationship quality, $t(86) = -1.77$, $p = .080$, $d = .19$, consistent with daily observations. These four baseline variables were mostly non-significantly correlated or at best weakly correlated with the daily variables, except one moderate association, $r = .59$, $p < .001$, between baseline relationship quality and daily relationship appraisals.

Table 2. Descriptive data and zero-order correlations among study variables on daily level and four baseline covariates: All participants (N = 174 persons, 2416 data points).

	M	SD	Possible range	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Relationship appraisals	35.30	5.96	7-42														
2. Mental depletion	45.13	17.93	7-105	-.295 (<0.01)													
3. Positive moods	41.22	10.84	7-63	.371 (<0.01)	-.723 (<0.01)												
4. Negative moods	21.21	11.42	7-63	-.422 (<0.01)	.726 (<0.01)	-.605 (<0.01)											
5. Judgment on partner's relationship appraisals	35.13	5.79	7-42	.780 (<0.01)	-.259 (<0.01)	.306 (<0.01)	-.332 (<0.01)										
6. Judgment on partner's positive moods	42.33	10.17	7-63	.309 (<0.01)	-.406 (<0.01)	.508 (<0.01)	-.333 (<0.01)	.410 (<0.01)									
7. Judgment on partner's negative moods	20.77	10.81	7-63	-.333 (<0.01)	.478 (<0.01)	-.351 (<0.01)	.570 (<0.01)	-.440 (<0.01)	-.577 (<0.01)								
8. EA for relationship appraisals	31.21	4.05	0-36	.419 (<0.01)	-.132 (<0.01)	.143 (<0.01)	-.226 (<0.01)	.323 (<0.01)	.120 (<0.01)	-.154 (<0.01)							
9. EA for positive moods	43.77	6.08	0-54	.097 (<0.01)	-.043 (0.16)	.033 (1.05)	-.047 (0.20)	.055 (0.07)	.055 (0.07)	-.023 (26.5)	.281 (<0.01)						
10. EA for negative moods	44.05	7.16	0-54	-.184 (<0.01)	-.267 (<0.01)	.211 (<0.01)	-.288 (<0.01)	-.129 (<0.01)	.204 (<0.01)	-.294 (<0.01)	.321 (<0.01)	.321 (<0.01)					
11. Age (baseline)	28.83	5.03	18-40	-.151 (<0.01)	-.090 (<0.01)	.038 (0.59)	-.075 (<0.01)	-.158 (<0.01)	.005 (.797)	-.021 (29.2)	.008 (7.11)	.053 (.009)	.053 (.009)				
12. Relationship length in years (baseline)	5.26	4.61	0.00-23.23	.009 (.654)	-.035 (.220)	.005 (0.13)	-.090 (<0.01)	-.038 (1.176)	-.039 (.057)	-.034 (.091)	.078 (.001)	.059 (.003)	.043 (.034)	.473 (<0.01)			
13. General empathy (baseline)	9.46	4.31	0-20	.035 (.007)	-.037 (.069)	-.064 (.002)	.036 (.080)	.089 (<0.01)	-.055 (.007)	-.015 (.468)	.023 (.266)	.062 (.002)	-.018 (.374)	-.025 (.218)	-.046 (.023)		
14. Relationship quality (baseline)	104.64	15.10	7-126	.586 (<0.01)	-.091 (<0.01)	.135 (<0.01)	-.176 (<0.01)	.527 (<0.01)	.144 (<0.01)	-.176 (<0.01)	.294 (<0.01)	.102 (<0.01)	.079 (<0.01)	-.223 (<0.01)	-.003 (.894)	.095 (<0.01)	

Note. M = mean. SD = standard deviation. Data presented correlations are *r* (*p*-value). Significant correlations are bolded.

Table 3. Descriptive data, t-tests, and zero-order correlations among study variables on daily level and four baseline covariates: For women (N = 87 persons, 1208 data points) and men (N = 87 persons, 1208 data points) separately.

	Women M(SD)	Men M(SD)	Paired t-test (women's mean minus men's mean)	r (p-value)										
				1	2	3	4	5	6	7	8	9	10	11
1. Relationship appraisals	34.88 (5.87)	35.72 (6.02)	-4.91 (<.001)	.172 (<.001)	-.357 (<.001)	-.419 (<.001)	-.527 (<.001)	-.344 (<.001)	.025 (.377)	-.157 (<.001)	-.214 (<.001)	-.069 (.017)	.046 (.111)	.630 (<.001)
2. Mental depletion	45.71 (18.12)	44.56 (17.72)	1.99 (.047)	-.231 (<.001)	.705 (<.001)	-.739 (<.001)	-.705 (<.001)	-.100 (.001)	-.002 (.944)	-.216 (<.001)	-.003 (.925)	.016 (.586)	-.091 (.001)	-.162 (<.001)
3. Positive moods	40.98 (10.72)	41.46 (10.95)	-1.35 (.176)	.318 (<.001)	-.707 (<.001)	-.707 (<.001)	-.646 (<.001)	.125 (<.001)	.008 (.777)	.190 (<.001)	.056 (.053)	.028 (.332)	.015 (.599)	.143 (<.001)
4. Negative moods	22.03 (11.88)	20.39 (10.89)	4.64 (<.001)	-.319 (<.001)	.745 (<.001)	-.569 (<.001)	-.569 (<.001)	-.213 (<.001)	-.024 (.403)	-.209 (<.001)	.006 (.828)	-.067 (.020)	.004 (.894)	-.276 (<.001)
5. EA for relationship appraisals	31.27 (4.05)	31.16 (4.06)	1.37 (.170)	.500 (<.001)	-.166 (<.001)	-.162 (<.001)	-.242 (<.001)	-.272 (<.001)	.005 (.860)	.306 (<.001)	.005 (.860)	.059 (.041)	.028 (.337)	.178 (<.001)
6. EA for positive moods	43.87 (6.15)	43.68 (6.01)	.98 (.329)	.172 (<.001)	-.083 (.004)	.058 (.042)	-.071 (.014)	.290 (<.001)	.025 (.377)	.325 (<.001)	.062 (.031)	.086 (.003)	.011 (.707)	.012 (.665)
7. EA for negative moods	44.08 (7.09)	44.01 (7.23)	.33 (.745)	.215 (<.001)	-.318 (<.001)	.233 (<.001)	-.365 (<.001)	.337 (<.001)	.318 (<.001)	.038 (.185)	.038 (.185)	.049 (.088)	-.010 (.719)	.018 (.527)
8. Age (baseline)	28.26 (4.77)	29.40 (5.22)	-3.86 (<.001)	-.099 (.001)	-.177 (<.001)	.014 (.624)	-.143 (<.001)	.014 (.638)	.049 (.091)	.072 (.012)	.072 (.012)	.428 (<.001)	.074 (.010)	-.264 (<.001)
9. Relationship length in years (baseline)	5.27 (4.62)	5.27 (4.62)	NA	.089 (.002)	-.065 (.024)	-.019 (.513)	-.112 (<.001)	.082 (.005)	.033 (.246)	.037 (.198)	.529 (<.001)	.037 (.198)	-.091 (.002)	-.017 (.565)
10. General empathy (baseline)	10.39 (4.17)	8.53 (4.24)	2.82 (.006)	.099 (.001)	.001 (.967)	-.139 (<.001)	.036 (.206)	.013 (.658)	.109 (<.001)	-.029 (.309)	-.084 (.004)	-.002 (.931)	.096 (.001)	
11. Relationship quality (baseline)	103.39 (15.77)	105.90 (14.38)	-1.77 (.080)	.542 (<.001)	-.024 (.403)	.126 (<.001)	-.083 (.004)	.405 (<.001)	.184 (<.001)	.137 (<.001)	-.208 (<.001)	.010 (.732)	.136 (<.001)	

Note. M = mean, SD = standard deviation. Data presented for t-tests are t (p-value). Data presented for correlations are r (p-value). Data for women are below the diagonal. Data for men are above the diagonal. Significant t-tests and correlations are boded. Degrees of freedom for all paired t-tests were 1207.

Table 4. APIM models predicting daily EA from mental depletion ($N = 174$ persons, 2416 data points).

	EA for relationship appraisals				EA for positive moods				EA for negative moods						
	β	SE	t	p	95% CI	β	SE	t	p	95% CI	β	SE	t	p	95% CI
(Intercept)	0.004	0.01	0.30	.734	[-0.02, 0.03]	0.01	0.02	0.27	.789	[-0.03, 0.04]	-0.00003	0.02	-0.002	.999	[-0.03, 0.03]
Gender	-0.002	0.03	-0.05	.958	[-0.06, 0.05]	-0.0008	0.04	-0.02	.982	[-0.07, 0.07]	0.01	0.03	0.26	.798	[-0.05, 0.07]
Actor's MD	-0.08	0.02	-3.70	<.001	[-0.12, -0.04]	-0.05	0.03	-1.86	.063	[-0.10, 0.00]	-0.08	0.03	-2.71	.007	[-0.14, -0.02]
Partner's MD	-0.07	0.02	-3.52	<.001	[-0.11, -0.03]	-0.12	0.03	-4.35	<.001	[-0.17, -0.06]	-0.21	0.03	-7.07	<.001	[-0.26, -0.15]
Lagged EA	0.17	0.02	8.78	<.001	[0.13, 0.21]	0.02	0.02	0.93	.354	[-0.03, 0.07]	0.04	0.02	1.99	.047	[0.00, 0.09]
Actor's mean MD	-0.001	0.02	-0.07	.945	[-0.03, 0.03]	0.004	0.02	0.20	.838	[-0.04, 0.05]	-0.0007	0.02	-0.04	.971	[-0.04, 0.04]
Partner's mean MD	-0.01	0.02	-0.36	.720	[-0.04, 0.03]	-0.0007	0.02	-0.03	.976	[-0.04, 0.04]	0.01	0.02	0.65	.515	[-0.03, 0.05]
Mean EA	0.72	0.01	57.04	<.001	[0.69, 0.74]	0.56	0.01	43.78	<.001	[0.53, 0.58]	0.62	0.01	46.75	<.001	[0.60, 0.65]
Gender X	0.02	0.03	0.65	.517	[-0.04, 0.08]	0.02	0.04	0.49	.627	[-0.05, 0.09]	0.04	0.03	1.16	.244	[-0.03, 0.11]
Actor's MD	-0.01	0.03	-0.44	.656	[-0.07, 0.04]	-0.09	0.04	-2.59	.010	[-0.16, -0.02]	-0.03	0.03	-0.98	.325	[-0.10, 0.03]
Partner's MD															
Gender X	-0.06	0.03	-2.14	.032	[-0.12, -0.01]	-0.01	0.03	-0.18	.860	[-0.07, 0.06]	-0.00006	0.03	-0.002	.998	[-0.06, 0.06]
Gender X	-0.002	0.02	-0.10	.918	[-0.04, 0.03]	-0.002	0.02	-0.09	.928	[-0.05, 0.04]	-0.001	0.02	-0.07	.947	[-0.04, 0.04]
Actor's mean MD	0.01	0.02	0.65	.518	[-0.02, 0.05]	0.01	0.02	0.59	.553	[-0.03, 0.06]	-0.01	0.02	-0.25	.799	[-0.05, 0.04]
Partner's mean MD	0.05	0.02	1.90	.057	[-0.001, 0.09]	0.003	0.02	0.13	.896	[-0.04, 0.05]	-0.003	0.02	-0.16	.876	[-0.05, 0.04]

Note. MD = mental depletion. Lagged EA = the empathic accuracy measured on the previous day. Each of the three EA scores was analyzed with a separate APIM model. Significant findings are bolded. Gender was coded as Women = 0, Men = 1.

Associations between mental depletion and EA, valence difference, and moderation by gender

Daily level results. Table 4 presents the results of the three APIM models on daily EA. Various significant actor effects and partner effects of mental depletion were observed, although of small effect sizes. Participants' own mental depletion was associated negatively with their EA for relationship appraisals, $\beta = -0.08$, $SE = 0.02$, $p < .001$, and EA for negative moods, $\beta = -0.08$, $SE = 0.03$, $p = .007$. No significant actor effect of mental depletion on EA for positive moods was found.

Partner's mental depletion was also associated negatively with actor's EA for relationship appraisals, $\beta = -0.07$, $SE = 0.02$, $p < .001$, actor's EA for positive moods, $\beta = -0.12$, $SE = 0.03$, $p < .001$, and actor's EA for negative moods, $\beta = -0.21$, $SE = 0.03$, $p < .001$. The effect of partner's mental depletion on EA for positive moods was moderated by gender, indicated by a significant gender \times partner's mental depletion interaction, $\beta = -0.09$, $SE = 0.04$, $p = .010$. The follow-up two-intercept APIM analysis (Table 5) showed that partner's mental depletion had a larger negative effect on men's ($\beta = -0.21$, $SE = 0.02$, $p < .001$) than on women's ($\beta = -0.12$, $SE = 0.03$, $p < .001$) EA for positive moods.

Person level results. Table 6 presents the results at the person level. No significant effects of mental depletion were found on EA for relationship appraisals and positive moods, but both the actor's and partner's mental depletion was negatively associated with participants' EA for negative moods (actor effect: $\beta = -0.34$, $SE = 0.09$, $p < .001$; partner effect: $\beta = -0.35$, $SE = 0.09$, $p < .001$). No significant gender and mental depletion interaction was observed.

Additional results on anchoring, EA, and mental depletion

As shown in Table 2, perceivers' judgements on partners' relationship appraisals and moods were positively associated with their own feelings and moods: relationship appraisals: $r = .780$, $p < .001$; positive moods: $r = .508$, $p < .001$; negative moods: $r = .570$, $p < .001$. The results indicated perceivers' employment of anchoring strategy in making empathic inferences.

Table 7 showed that the average anchoring scores were 33.97 ($SD = 2.40$, $Range = 0-36$), 45.94 ($SD = 6.36$, $Range = 0-54$), and 46.47 ($SD = 6.36$, $Range = 0-54$) for inferences of partner's relationship appraisals, positive moods, and negative moods respectively. Paired t -tests showed that women relied less on anchoring when making judgements compared to their male partners: relationship appraisals: $t(1207) = -2.53$, $p = .017$, $d = -.07$; positive moods: $t(1207) = -2.62$, $p = .009$, $d = -.08$; negative moods: $t(1207) = -4.46$, $p < .001$, $d = -.13$. Table 8 presents the results of correlations between anchoring scores using the difference score approach, mental depletion, and EA. Overall speaking, one's anchoring tendency was negatively associated with mental depletion: relationship appraisals: $r = -.203$, $p < .001$; positive moods: $r = -.213$, $p < .001$; negative moods: $r = -.345$, $p < .001$. As for the relationship between anchoring and EA, we

Table 5. Two-intercept APIM model predicting daily EA for positive moods from mental depletion (N = 174 persons, 2416 data points).

	Women				Men					
	b	SE	t	p	95% CI	b	SE	t	p	95% CI
(Intercept)	0.01	0.02	0.27	.789	[-0.03, 0.04]	0.0004	0.02	0.24	.812	[-0.03, 0.04]
Actor's MD	-0.05	0.03	-1.86	.063	[-0.10, 0.00]	-0.03	0.03	-1.19	.233	[-0.08, 0.02]
Partner's MD	-0.12	0.03	-4.35	< .001	[-0.17, -0.06]	-0.21	0.02	-8.56	< .001	[-0.26, -0.16]
Lagged EA	0.02	0.02	0.93	.354	[-0.03, 0.07]	0.02	0.02	0.70	.483	[-0.03, 0.06]
Actor's mean MD	0.004	0.02	0.20	.838	[-0.04, 0.05]	0.002	0.02	0.11	.910	[-0.04, 0.04]
Partner's mean MD	-0.0007	0.02	-0.03	.976	[-0.04, 0.04]	0.01	0.02	0.65	.518	[-0.03, 0.05]
Mean EA	0.56	0.01	43.78	< .001	[0.53, 0.58]	0.56	0.01	42.92	< .001	[0.54, 0.59]

Note. MD = mental depletion. Lagged EA = the empathic accuracy measured on the previous day. Significant findings are bolded.

Table 6. APIM models predicting aggregated person-level empathic accuracy from mental depletion (N = 174).

	EA for relationship appraisals				EA for positive moods				EA for negative moods				
	β	SE	t	p	β	SE	t	p	β	SE	t	p	95% CI
(Intercept)	0.02	0.11	0.21	.838	0.02	0.11	0.19	.850	0.01	0.08	0.12	.908	[-0.15, 0.17]
Gender	-0.04	0.04	-0.90	.368	-0.03	0.07	-0.42	.677	0.00	0.08	-0.01	.989	[-0.16, 0.16]
Actor's MD	-0.13	0.12	-1.06	.290	-0.01	0.13	-0.05	.959	-0.34	0.09	-3.62	< .001	[-0.53, -0.16]
Partner's MD	-0.09	0.12	-0.76	.450	-0.14	0.13	-1.13	.258	-0.35	0.09	-3.72	< .001	[-0.54, -0.17]
Gender X Actor's MD	0.10	0.21	0.48	.632	0.19	0.20	0.94	.348	0.27	0.16	1.73	.085	[-0.04, 0.57]
Partner's MD									-0.24	0.15	-1.57	.119	[-0.55, 0.06]

Table 7. Means and SDs of anchoring scores for the whole sample ($N = 174$ persons, 2416 data points) and for women ($N = 87$ persons, 1208 data points) and men ($N = 87$ persons, 1208 data points) separately.

	Possible range	Whole sample	Women	Men	Paired t-test
		$M(SD)$	$M(SD)$	$M(SD)$	$t(p \text{ value})$
Anchoring scores for relationship appraisals inferences	0–36	33.97 (2.40)	33.86 (2.55)	34.08 (2.24)	–2.53 (.012)
Anchoring scores for positive moods inferences	0–54	45.94 (6.36)	45.66 (6.56)	46.23 (6.13)	–2.62 (.009)
Anchoring scores for negative moods inferences	0–54	46.47 (7.01)	45.94 (7.53)	47.00 (6.40)	–4.46 (<.001)

Note. M = mean. SD = standard deviation. Data presented for t-tests are t (p -value). Significant t-tests results are boded. Degrees of freedom for all paired t-tests were 1207.

Table 8. Correlations between anchoring scores, mental depletion and EA for all participants ($N = 174$ persons, 2416 data points) and for women ($N = 87$ persons, 1208 data points) and men ($N = 87$ persons, 1208 data points) separately.

		Whole sample	Women	Men
		r ($p \text{ value}$)	r ($p \text{ value}$)	r ($p \text{ value}$)
MD \longleftrightarrow Anchoring scores	<i>relationship appraisals</i>	–.203 (<.001)	–.219 (<.001)	–.183 (<.001)
	<i>positive moods</i>	–.213 (<.001)	–.212 (<.001)	–.212 (<.001)
	<i>negative moods</i>	–.345 (<.001)	–.375 (<.001)	–.309 (<.001)
EA \longleftrightarrow Anchoring scores	<i>relationship appraisals</i>	.287 (<.001)	.333 (<.001)	.239 (<.001)
	<i>positive moods</i>	.093 (<.001)	.102 (<.001)	.085 (.003)
	<i>negative moods</i>	.274 (<.001)	.324 (<.001)	.221 (<.001)

Note. MD refers to mental depletion. EA refers to empathic accuracy.

observed significant positive correlations: relationship appraisals: $r = .287, p < .001$; positive moods: $r = .093, p < .001$; negative moods: $r = .274, p < .001$. The results for each gender were also presented in Table 8, and the correlations patterns were similar to the findings on the whole sample.

Discussion

Using a dyadic and ecological dataset of heterosexual couples, we showed for the first time that both actor's and partner's mental depletion was related to lower EA for both

relationship appraisals and moods. Mental depletion and EA for negative moods were especially consistent, being associated on both daily and person levels. Besides, results stood when controlling for baseline covariates. Gender moderated the association between mental depletion and EA for positive moods. There was also evidence of anchoring, which was associated positively with EA but negatively with mental depletion.

Is EA lower when the actor is mentally depleted?

Actor's mental depletion was linked to lower EA for relationship appraisals and negative moods (*H1a*), consistent with the dual-processing model of cognition (Evans & Stanovich, 2013) that mental depletion impairs judgment accuracy, for depleted perceiver's heavy reliance on superficial cues and stereotypes (Tadmor et al., 2018). This finding also aligns with previous research that showed EA was reduced when cognitive functioning was disturbed (Crenshaw et al., 2019; Gadassi et al., 2011). Besides, the reduced EA performance of mentally depleted people could also result from a lack of motivation. People have a heightened need for cognitive closure when mentally depleted (Kruglanski & Webster, 1996), thus may be less willing to attend to partners' transient emotional signals. Actor's mental depletion did not associate with their EA for positive moods. Possibly, reading partner's positive moods takes little mental effort even when perceivers are depleted because people express positive emotions more directly (Nezlek & Kuppens, 2008).

Is EA lower when the partner is mentally depleted?

Partner's mental depletion was negatively associated with all EA variables (*H1b*), consistent with findings suggesting that fatigue lowers readability. Chronically fatigued individuals tend to hold inconsistent outward social images and internal emotions. They may behave in a socially compliant way while being hostile within (Hambrook et al., 2011). Fatigued people also show fewer emotional expressions (Rimes et al., 2016). Thus, perceivers have fewer, but more misleading, emotional signals to make judgments of depleted targets.

Does mental depletion matter more for negative moods?

H2 was largely supported. Effects of mental depletion were more robust on EA for negative moods. EA for negative moods was linked to both actor's and partner's mental depletion, at both daily and person levels. Conversely, EA for positive moods was only linked to partner's mental depletion, and only at the daily level. The discrepancy in actor effects on EA for negative versus positive moods may stem from the higher cognitive demand in detecting indirect, negative (vs. direct, positive) emotions. This also aligns with the literature under the framework of the process model of emotion regulation (Gross, 1998). When feeling depleted, people may modify their responses to emotional stimuli within a social situation by avoiding or deploying less attention to negative, but not positive, stimuli (Watanabe et al., 2019). Partner effects on EA for negative moods may relate to the notion of fatigue-induced emotion

suppression. Depleted targets are less willing to disclose their negative feelings, for such disclosure could agitate conflicts (Willems et al., 2020).

Role of gender?

Most findings were similar for men and women, but men's EA for women's positive moods was more affected by women's mental depletion than vice versa. *H3* was thus supported in EA for positive moods. The gendered effects may be explained by gender differences in emotion recognition ability and gender stereotypes that affect motivations. Women are better at recognizing low-intensity emotions (Hoffmann et al., 2010), while men rely more on expressive facial information to recognize emotions (Thayer & Johnsen, 2000). Mentally depleted targets exhibited fewer/less intense positive moods ($r = -.723, p < .001$), rendering more impairments in *male* perceivers' EA. Alternatively, because men are generally less emotionally expressive than women (Fischer & LaFrance, 2015), reduction in emotion expressions may be less salient in depleted men. The stronger expectation for women to be communal and empathetic (Eagly & Wood, 1991; Ickes et al., 2000) may also motivate women to maintain empathy even when depleted. Future research is needed to pinpoint the underlying mechanism of the gender differences.

Is anchoring present and how does it fit in the mental depletion-EA framework?

Anchoring has been shown to be a common strategy in social judgments and has often been discussed in EA research (Sened et al., 2020; Tamir & Mitchell, 2013). Our study, although not designed to test anchoring, allowed us to test several questions for exploratory purposes: 1. Is anchoring present in our dataset? 2. How is anchoring related to one's EA and mental depletion?

Consistent with our prediction (*H4a*), we found the presence of anchoring in perceivers' EA inferences, as indicated by the positive correlations between one's own relationship appraisals and moods and their judgements of partners' relationship appraisals and moods. This result aligns with prior research showing people's employment of anchoring-and-adjustment strategy in mentalizing with others (Sened et al., 2020; Tamir & Mitchell, 2013).

We observed positive associations between one's anchoring tendency and EA (*H4b*). This finding might seem a bit counterintuitive at first sight, but it makes sense if the anchor is a valid one. Our study is situated in romantic relationships where partners often share similar experiences or affective states. The shared context and frequent interactions may make one's own feelings an efficient anchor for understanding the partner, increasing the likelihood that anchoring leads to accurate judgments rather than bias (Sened et al., 2020). Moreover, anchoring that is followed by sufficient adjustments could lead to accuracy. When people anchor on their own feelings but then adjust sufficiently to account for differences in their partner's state, anchoring can facilitate accurate empathic inferences. This is consistent with the dual-process view where anchoring is the initial guess and adjustment refines accuracy (Tamir & Mitchell, 2013).

Regarding *H4c*, we found that anchoring was negatively correlated with one's mental depletion level. In other words, participants seemed to use less self-anchoring in making inferences about partner's feelings and moods when they were mentally depleted. This result seems inconsistent with the dual-process analogue of anchoring-and-adjustment strategy, where anchoring is said to be a "fast and effortless" process while adjustment is "deliberate and resource-demanding". However, if we view anchoring-and-adjustment as a deliberate, adaptive strategy to achieve accuracy, our result may suggest that mental depletion reduces the ability or motivation to engage in this adaptive anchoring-and-adjustment process, resulting in less anchoring behaviour or less effective anchoring, hence the negative correlation. According to research investigating how mental depletion would modulate anchoring (Banker et al., 2017; Röseler et al., 2020), depleted participants may be less able to identify a good anchor. If our measure of anchoring captures effective use of self-based heuristics (anchoring on own feelings or thoughts) rather than mere susceptibility to external anchors, then mentally depleted individuals might anchor less because they are less engaged or less able to use their own internal states as reliable guides. Instead, they might respond more randomly or rely on other cues.

Practical implications

Our findings suggest communication when either partner is mentally depleted is not ideal, since one partner's mental depletion reduces both parties' empathic accuracy, which could lead to misunderstandings or conflicts during communication. Attempts to communicate negative events should especially take the partner's mental depletion into account, as a fatigued partner is less likely to be empathetic, especially for negative moods. Also, awareness of one's own mental fatigue level and accompanying fluctuations in EA may be instrumental for a person to decide whether he/she is prepared for an empathic exchange. Moreover, one's mental depletion may inadvertently reduce partner's EA, possibly through one's own lowered and more misleading expressions, an effect strongest when men try to empathize with fatigued female partners' positive moods. Therefore, our study suggests romantic couples should be mindful of antecedents or signs of depletion (e.g., working overtime, sleep deprivation, reduced emotion expressions) in themselves and their partner, and try to schedule critical discussions when both partners are rested. If discussions under depletion are unavoidable, direct and candid disclosure of thoughts/feelings can foster understanding and is preferred to overreliance on partners to "read the mind", especially as people often inaccurately (over)estimate others' actual EA (Ickes & Hodges, 2013; Wong et al., 2021). Our findings on anchoring, EA, and mental depletion suggest self-anchoring might be an effective strategy to achieve accurate inferences of romantic partners' feelings and moods. However, it needs caution to use this strategy when mentally depleted, as people might not be able to identify a good starting point to anchor their judgements on.

Given the high prevalence of fatigue in adults (Yoon et al., 2023), relationship therapists or counselors should consider the role of mental depletion in clients' relationship, incorporate relevant scales into their assessment package, and give recommendations on replenishing mental resources. Companies can implement policies such as

flexible work hours to mitigate work-related fatigue in employees. Our study also informs policymakers by highlighting the need for targeted mental health resources and programs to address mental depletion as a significant factor affecting personal relationships.

Strengths and limitations

This study broke new ground by enhancing understanding of the role of mental depletion in people's accuracy in empathizing romantic partners' mental states with a diary procedure. Besides, the findings extend evidence for the importance of considering valence in studying empathy and its associated factors such as mental depletion. They also enrich the literature on gender and EA. Notably, the three EA variables showed as independent constructs ($|r|s < .34$), suggesting the value for other studies to expand the choice of EA variables. In the future, it would be interesting to examine people's accuracy in reading others' mental depletion. Moreover, we highlighted a potentially helpful role of anchoring as people used it more often when they were less mentally depleted and it co-occurred with higher EA.

There are several limitations. First, experimental procedures are needed to attest to the implicit assumption that mental depletion reduces EA and the mechanism through which it does so. Although the findings are compatible with this theorized effect, we cannot rule out the possibility that the associations between high EA and low mental depletion were merely due to EA affecting mental depletion, or there are other factors influencing the relationship between mental depletion and EA. However, the causal direction from EA to mental depletion is unlikely, as mental depletion and EA on the previous day were not correlated (see [Supplemental Table S4](#)) and our daily level analyses controlled for a lagged EA variable. Second, while the diary procedure has ecological validity, mental depletion was self-reported. The self-report measure is useful insofar as subjects' subjective experience of fatigue is concerned, but future research could replicate our findings with objective measures of mental depletion. Third, the difference score approach enabled us to obtain an accuracy score for each daily observation, but it is not designed to disentangle the observed effects on each component measure of the score ([Edwards, 1995](#)). Nevertheless, other measures of accuracy (e.g., tracking accuracy) can only generate accuracy scores on the person level. Thus, the current difference score approach is more appropriate for diary studies and research questions like ours. Fourth, although the study generated several new empirical and theoretical insights regarding the presence of anchoring in an Asian couple sample and its relationships to mental depletion and EA, the study was not designed to address anchoring and thus could not establish the amount of adjustment following anchoring, which would help address whether anchoring in this context was a type 1 or type 2 process in the dual process model. Lastly, our participants included only heterosexual couples (to investigate gender moderations) in Hong Kong and most of them received tertiary education. People's expectations about romantic partners and their behaviors in romantic relationships are shaped by the cultural and societal contexts ([Cionea et al., 2019](#); [Dion & Dion, 1996](#)) they are in, thus the study findings might not be generalized to societies that have different gender norms or marriage structures (e.g., matrilineal Mosuo in Southwest China, see [Yong et al., 2021](#)). Despite these limitations, this study is strengthened by several characteristics, including the employment of the ecological diary method, being the first

investigation between mental depletion and EA, the inclusion of three EA variables, the focus on both dyad members and on both daily and person levels, and the control for baseline levels and previous day EA.

Conclusion

We showed that EA towards romantic partners fluctuated daily alongside self and partner's mental depletion. Mood valence and gender are also relevant factors to consider in EA research. Mentally depleted people used less anchoring, while anchoring may be an effective strategy in achieving EA under the right circumstances. Findings call for the theoretical consideration of the dual processing model of cognitive resources, the process model of emotion regulation, and gender role theory in understanding daily empathic accuracy among dyadic partners, romantic couples more specifically. The importance of addressing fatigue, a common challenge in modern societies, should be highlighted. Findings inform the choice of optimal timing and strategies for good communication.

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Open research statement

As part of IARR's encouragement of open research practices, the authors have provided the following information: This was not pre-registered.

The data used in the research are available. The data can be obtained at: <https://osf.io/gw678/files> or by emailing: iwwong@cuhk.edu.hk. The materials used in the research are available. The materials can be obtained at: <https://osf.io/gw678/files> or by emailing: iwwong@cuhk.edu.hk.

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Supplemental Material

Supplemental material for this article is available online.

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