

Emotion

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Online First Publication, February 20, 2025. <https://dx.doi.org/10.1037/emo0001510>

CITATION

Gross, A. M., Lai, J., Eckland, N. S., & Thompson, R. J. (2025). Interoceptive awareness and clarity of one's emotions and goals: A naturalistic investigation. *Emotion*. Advance online publication. <https://dx.doi.org/10.1037/emo0001510>

Interoceptive Awareness and Clarity of One's Emotions and Goals: A Naturalistic Investigation

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Interoceptive awareness is a multidimensional construct that denotes the conscious level of one's ability to sense the physiological conditions of their body. Theories (e.g., constructionist theories of emotion) propose associations with psychological clarity, yet empirical support is limited when examining these constructs globally. We hypothesized that these associations exist at the momentary level and that they are associated with certain individual differences (i.e., life satisfaction, conscientiousness, depression, neuroticism). Using experience sampling methodology, participants ($N = 179$ adults; $M_{\text{age}} = 35.3$, $SD_{\text{age}} = 12.2$) reported on six dimensions of interoceptive awareness, as well as emotional clarity and goal clarity five times a day over 14 days. They also completed self-report measures assessing individual differences. We found nearly all measured interoceptive awareness dimensions were independently, positively associated with emotional clarity and goal clarity. These associations were, unexpectedly, strengthened by greater depression and neuroticism and weakened by greater life satisfaction and conscientiousness, suggesting potential implications for the individual differences involved in how people generate, clarify, and understand their emotions and goals. These findings demonstrate dimensions of momentary interoceptive awareness are positively associated with emotional and goal clarity and identify potential mechanisms underlying associations between interoceptive awareness and psychological clarity, including psychological outcomes and personality traits. Individuals with elevated depression or neuroticism may rely more heavily on bottom-up processing to understand their emotions and goals, whereas individuals high in life satisfaction or conscientiousness may be more equipped to use top-down processing for this purpose.

Keywords: interoception, interoceptive awareness, life satisfaction, depression, clarity


Supplemental materials: <https://doi.org/10.1037/emo0001510.supp>


A person's ability to sense the physiological conditions of their body, a process known as interoception, has implications for well-being (Craig, 2002). Interoception is often divided into processes reflecting accuracy (indexed through behavioral tasks, e.g., heartbeat counting; Dale & Anderson, 1978; Schandry, 1981) or awareness (i.e., sensibility; indexed through self-reported awareness of one's bodily condition). These measures are inconsistently linked with each other (Ferentzi, Bogdány, et al., 2018; Garfinkel et al., 2015), and measures of interoceptive accuracy specifically are inconsistently linked with affective processes important for well-being (e.g., emotion regulation; Ferentzi et al., 2019; Schuette et al., 2021). Interoceptive awareness may be important for emotion regulation specifically, as it allows individuals to notice internal


bodily signals that are associated with emotional states (Passarello et al., 2023). Further, high interoceptive awareness is positively related to putatively adaptive emotion regulation strategies and negatively associated with levels of internalizing psychopathology (Lee et al., 2024). Given these associations, interoceptive awareness is likely relevant for identifying one's emotions and goals: processes that are often antecedent to emotion regulation and facilitative of psychological health.


Interoceptive awareness may be associated with a person's well-being through its connections with one's clarity and understanding of their emotions (emotional clarity; Gohm & Clore, 2002). Emotional clarity is an important factor to consider, as it has been associated with several social, emotional, and health benefits, including greater

Kristen A. Lindquist served as action editor.

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Funding was provided by the Office of the Provost at Washington University in St. Louis. The authors thank Anna Leah Davis and Analise Black for their assistance with data collection.

Angie M. Gross played a lead role in conceptualization, writing—original draft, and writing—review and editing and a supporting role in data curation.

Jocelyn Lai played a lead role in data curation and formal analysis and a supporting role in writing—original draft and writing—review and editing. Nathaniel S. Eckland played a lead role in visualization and a supporting role in data curation, formal analysis, writing—review and editing, and methodology. Renee J. Thompson played a lead role in conceptualization, funding acquisition, methodology, project administration, and supervision, a supporting role in data curation, and an equal role in writing—review and editing.

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meaning in life, improved interpersonal relationships, and more efficient emotion regulation (e.g., Abeyta et al., 2015; Lischetzke & Eid, 2017). Other investigations, too, have considered emotional clarity in daily life and found it to be similarly beneficial (Eckland & Berenbaum, 2021; Park & Naragon-Gainey, 2019). Constructionist views of emotion argue that mental representations of emotions are constructed in part by understanding affective signals from the body (MacCormack & Lindquist, 2017), indicating interoceptive awareness should be linked to emotional clarity. Surprisingly though, meta-analytic work has found little to no association between self-reported measures of interoceptive awareness and emotional clarity (Trevisan et al., 2019).¹ Much of the literature, however, has only measured interoceptive awareness at the trait level, yet more some investigations indicate substantial within-person variation in interoceptive processes and that interoceptive awareness is linked to affective experiences in daily life (Höller et al., 2021; Poerio et al., 2024; Tan et al., 2023). Thus, the theoretical role of interoceptive awareness in generating clarity over one's emotions combined with the lack of association at a between-person level may indicate that these associations are better captured within-person, dynamically as they unfold in throughout the day.

Another type of psychological clarity, goal clarity (Eckland & Berenbaum, 2023; Emmons, 1986), may also be shaped in part by one's awareness of their physiological and internal states. People vary across time and from each other in terms of how their goals (i.e., internal representations of desired states; Austin & Vancouver, 1996) are mentally represented. Goal clarity refers to the specificity and concreteness that people use to mentally represent and express their goals through language. Goal clarity can be thought of as an analogous, but distinct, process to emotional clarity (Eckland & Berenbaum, 2023), and at the between-person level, both are associated with greater life satisfaction and lower levels of depression. Goal clarity is also associated with greater commitment and fulfillment of one's goals (Emmons, 1986). Quigley et al. (2021) described a key function of interoceptive awareness as gathering information from the body for energy allocation and regulation. In other words, interoceptive awareness allows one to better understand their body's energy output and direct behaviors toward energy renewal. In this way, interoceptive awareness may drive goals that direct daily behaviors relevant to one's bodily state. Interoceptive awareness is also known to be relevant to a person's responsiveness toward their biological drives, such as hunger, that motivate behavior (i.e., detection of hunger cues leads to eating, detection of satiation cues stops eating behavior; Ferrario et al., 2016). Having greater awareness of one's internal states may help to more clearly shape one's goals as knowledge of one's current state would help to inform one's desired states in the future. Thus, understanding the potential momentary associations of interoceptive awareness and goal clarity may enhance understanding of how people can generate, mentally represent, and work toward their goals successfully.

Though we hypothesize that greater momentary awareness of physiological states will be linked to greater emotional and goal clarity, we think this link may be strengthened (or weakened) by well-being and individual differences. Specifically, both emotion and goal clarity have been linked to greater life satisfaction and lower depression (Eckland & Berenbaum, 2023). It is possible that those who are more satisfied with their lives and feel less depressed experience greater psychological clarity by drawing more information

from their body and internal states. This prediction is supported by research demonstrating the link between dispositional mindfulness—which involves a cultivated awareness of one's body sensations, emotions, and thoughts—and their interconnections—with greater life satisfaction (Kong et al., 2014) and lower depression (Tomlinson et al., 2018). Similarly, the personality domain of conscientiousness is thought to encompass one's abilities to clearly set, work toward, and attain goals (Roberts et al., 2014). Conscientiousness encompasses abilities to inhibit prepotent responses in service of self-regulation and working toward important goals (Roberts et al., 2014). One characteristic of highly conscientious people may be that they utilize their body as a source of information for informing their understanding of goals and emotions, which may allow for more goal-directed action to supplant other prepotent information in one's daily life. On the other hand, the personality domain of neuroticism is thought to include a lack of emotional stability, clarity, and increased propensity to feel unpleasant emotions. Since those that are more neurotic tend to experience less emotional clarity (Gohm & Clore, 2002), it is possible they are not drawing from effective sources of information (e.g., one's bodily experiences) to understand what they feel.

Current Investigation

Using an experience sampling methodology (ESM) where participants reported on their levels of interoceptive awareness, emotional clarity, and goal clarity five times a day over 2 weeks, we sought to address two aims. Our first aim was to examine how different dimensions of interoceptive awareness—body noticing, attention regulation, emotional awareness, self-regulation, body listening, and body trusting—are associated with momentary emotional and goal clarity. Based on various emotion theories, we expected that all dimensions of interoceptive awareness would be associated with greater emotional clarity and goal clarity. We predicted that moments when interoceptive awareness was greater than usual would be linked to moments of greater emotional clarity (Hypothesis 1a) and goal clarity (Hypothesis 1b). Our second aim was to explore the influence of well-being and personality factors that we had theoretical reasons to expect would strengthen (i.e., life satisfaction and conscientiousness; Hypothesis 2a) and weaken (i.e., depression and neuroticism; Hypothesis 2b) the associations between interoceptive awareness and psychological clarity.

Method

Participants

From November 2022 through October 2023, adults between the ages 18 and 65 were recruited through flyers and a volunteer registry from the greater St. Louis, Missouri community. Recruitment was

¹ Trevisan et al. (2019) conducted a meta-analysis of interoceptive awareness and alexithymia. Alexithymia is characterized by difficulty identifying and describing emotions (i.e., low emotional clarity) and an externally oriented thinking style (i.e., low attention to emotions). These constructs are also thought to be involved in emotional awareness (e.g., Boden & Thompson, 2017; Eckland et al., 2021) and emotional intelligence (e.g., Eckland & Thompson, 2023; Salovey et al., 1995). Meta-analytic work (Boden & Thompson, 2017) shows emotional clarity and attention to emotions are only moderately correlated, which limits what can be learned about alexithymia when total scale scores are used.

targeted to ensure our sample was racially and ethnically representative of the area, had an equal distribution of men and women, and was stratified by 10-year age bins. Because the parent study involved assessing peripheral physiology, individuals were ineligible if they (a) were pregnant; (b) suffered from severe asthma, heart disease, or arthritis; or (c) had an implanted cardiac device. The final sample included 179 adults ($M_{\text{age}} = 35.3$, $SD_{\text{age}} = 12.3$; 53% identified as women, 46% as men, 2% as nonbinary, and <1% as transgender). Most of the sample was White (69%), followed by Black (15%), Asian (13%), Middle Eastern (3%), Indigenous (2%), and Hawaiian/Pacific Islander (<1%). A total of 8% identified as Latinx, with 3% not reporting.

Procedure

Interested participants completed a phone screen which provided an overview of the study procedures. If eligible, participants were scheduled for an in-person lab session and emailed a link to an online survey that included self-report surveys that assessed mental health, personality, emotions, and technology use (for more information, see <https://osf.io/7s6wn/>). We focus on describing the lab session procedures relevant to the current investigation. Participants first provided informed consent and were instructed on how to download the necessary phone applications for the ESM portion of the study (O'Brien et al., 2024). They then completed a 30-min semistructured tutorial where participants learned about the ESM questions and responses. Experimenters asked participants to provide examples to illustrate understanding of various concepts; experimenters also provided scripted examples when needed.

All ESM surveys were sent within a 15-hr time window that participants chose during the tutorial. Participants completed five surveys a day for 14 days (separated by approximately 3-hr time windows), beginning the morning after the lab session. Participants had a 20-min time window to complete each survey and received a reminder notification 10 min after the initial notification, as well as a third notification 3 min before the survey closed. Participants were compensated \$70 for phone completing the surveys, plus an additional \$15 if they completed at least 80% of the surveys. Overall, a total of 8,690 ESM surveys were completed out of a possible 12,530. On average, individuals completed 69.4% of surveys ($SD = 15.1\%$). Two participants withdrew during the ESM portion of the study, and two others were excluded from analyses as they completed none or only one ESM assessment, resulting in the final sample of 179 subjects.

Measures

Momentary Measures

Momentary Interoceptive Awareness. To assess momentary dimensions of interoceptive awareness, we administered six ESM items, each representing a dimension of interoceptive awareness assessed by the Multidimensional Assessment of Interoceptive Awareness Version 2 (MAIA-2) scale (Mehling et al., 2018).² We adapted these six items from Höller et al. (2021), who selected one item from each respective scale that reflected the highest factor loading in the original MAIA-2 scale. A comparison between the ESM items used in the present study and the ESM items used in Höller et al. (2021) and MAIA-2 (Mehling et al., 2018) is included in the Supplemental Material, including correlations between the

subscales of the MAIA-2 (see Supplemental Table S1). We modified each item by altering the time frame from “At this moment ...” to “During the last hour ...” We also made one further modification to the emotional awareness item (described below). In addition, we added 2 points to the Likert scales used in Höller et al. (2021) for consistency with other measures in the parent study; participants used a 7-point Likert scale (1 = *never*; 7 = *always*) to rate each item. To ensure the items reflected their respective MAIA-2 subscales, we ran a series of multilevel models where we predicted each dimension of interoceptive awareness (Level 1) from their respective trait version (Level 2).

Body Noticing. We assessed momentary noticing with the item, “During the last hour, I noticed where in my body I was comfortable.” The noticing ESM item was significantly associated with the MAIA-2 noticing subscale ($b = 0.29$, $SE = 0.07$, $p < .001$).

Attention Regulation. We assessed momentary attention regulation with the item, “During the last hour, I maintained awareness of my inner bodily sensations.” Momentary awareness of bodily sensations was significantly associated with the MAIA-2 attention regulation subscale ($b = 0.26$, $SE = 0.09$, $p = .005$).

Emotional Awareness. We assessed momentary emotional awareness with the item, “During the last hour, I noticed how my body changed when I felt emotion.” Aiming to capture this construct more broadly, we altered the item from its original form so that it was not specific to any one emotion (see Supplemental Table S1). Momentary noticing of bodily changes when experiencing emotions was significantly associated with the MAIA-2 emotional awareness subscale ($b = 0.35$, $SE = 0.08$, $p < .001$).

Self-Regulation. We assessed momentary self-regulation with the item, “During the last hour, I used my breath to reduce tension.” This item was significantly associated with the MAIA-2 self-regulation subscale item ($b = 0.27$, $SE = 0.09$, $p = .003$).

Body Listening. We assessed momentary body listening with the item, “During the last hour, I listened to my body to inform me about what to do.” This adapted ESM item was significantly associated with the MAIA-2 body listening subscale ($b = 0.31$, $SE = 0.07$, $p < .001$).

Body Trusting. We assessed momentary body trusting with the item, “During the last hour, I felt my body was a safe place.” The momentary feeling of being safe in the body was significantly associated with the MAIA-2 body trusting subscale ($b = 0.36$, $SE = 0.06$, $p < .001$).

Momentary Emotional Clarity. Participants were asked to report their momentary emotional clarity. We used a single item, “During the last hour, my emotions were clear,” assessed on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*) to remain consistent with previous work. This item was chosen based on Eckland and Berenbaum (2021) who found it to have a strong association with a trait measure of emotional clarity. The time frame of the item was changed from “Today ...” to “During the last hour ...,” and the item’s language was modified to past tense to be consistent with the other ESM items.

Momentary Goal Clarity. Participants were asked to report their momentary goal clarity. Development of the goal clarity item

² We did not assess “not worrying” and “not distracting” because these two subscales have been shown to have low reliability (e.g., Mehling et al., 2012). In addition, omitting two dimensions allowed us to reduce participant burden.

was based on research examining personal striving in daily life, which reflects directed goal-related behaviors (Emmons, 1986). We measured goal clarity with the item, “During the last hour, my main goal has been clear,” which was designed to mirror the phrasing of the emotional clarity item. Momentary goal clarity was assessed on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*).

Self-Report Measures of Psychological Well-Being

See Table 1 for means and standard deviations of the following measures:

Trait Interoceptive Awareness. We administered the MAIA-2 (Mehling et al., 2018). It is a 37-item measure designed to capture eight different dimensions of body awareness that may have differential effects on health outcomes. All subscales were measured from 0 (*less body awareness*) to 5 (*more body awareness*). To address the current aims, we utilized the following six subscales: Body Noticing (four items), Attention Regulation (seven items), Emotional Awareness (five items), Self-Regulation (four items), Body Listening (three items), and Body Trusting (three items). See Supplemental Table S1 for sample items.

Life Satisfaction. We assessed life satisfaction using the Satisfaction with Life Scale (Diener et al., 1985). This five-item measure included items such as, “In most ways my life is close to ideal.” Items were rated on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). Internal consistency of the scale was high ($\omega = .93$); items were averaged.

Depression. We assessed depression using a subscale of the shortened Mood and Anxiety Symptoms Questionnaire–8 (Watson et al., 1995). Participants indicated the extent to which they felt a range of symptoms or sensations over the past week (e.g., “felt withdrawn from other people”). We used Mood and Anxiety Symptoms Questionnaire–8, as it has been shown to distinguish current major depressive episodes more accurately than other depression measures (Bredemeier et al., 2010). Items are rated on a 5-point Likert-type scale (1 = *not at all*; 5 = *extremely*). Internal consistency of the items was high ($\omega = .92$). Items were summed.

Conscientiousness. Although we measured four Big Five traits, we only had hypotheses for conscientiousness and neuroticism in

the current investigation. We measured conscientiousness using the 12-item Conscientiousness subscale of the Big Five Inventory–2 (Soto & John, 2017). Participants rate the extent to which they agree statements describe their personality using a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). An example statement is “I am someone who is dependent, steady.” Internal consistency for the conscientiousness subscale was high ($\omega = .90$); items were averaged.

Neuroticism. We assessed neuroticism using the 12-item Neuroticism subscale of the Big Five Inventory–2 (Soto & John, 2017). An example item is “I am someone who is moody, has up and down mood swings.” Internal consistency for the subscale was high ($\omega = .92$); items were averaged.

Data Analytic Plan

To test our first hypotheses (Hypothesis 1a/Hypothesis 1b) that momentary interoceptive awareness is associated with greater emotional and goal clarity, we calculated between- and within-person correlations among ESM variables. As a follow-up, all dimensions of interoceptive awareness were included in a single multilevel model (MLM) to examine which dimensions were robust in predicting emotional and goal clarity. We used MLMs due to the nested structure of the data of repeated assessments nested within people.

The MLMs included the intercept as a random effect as individuals may differ in their average level of emotional and goal clarity at baseline. Model comparisons were conducted between models with and without dimensions of interoceptive awareness as random effects. The multilevel model comparisons indicated that the model including random slopes for each dimension of interoceptive awareness was a better fit for the data, $\chi^2(33) = 510.67, p < .001$, suggesting people differ in the strength of the associations between dimensions of interoceptive awareness and emotional clarity. Similarly, the model with random slopes for each dimension of interoceptive awareness with goal clarity was better, $\chi^2(33) = 206.38, p < .001$, suggesting that people differed in the strength of the associations between dimensions of interoceptive awareness and goal clarity.

MLMs were also used to test our hypotheses that the associations between interoceptive awareness with emotional and goal clarity would be strengthened by life satisfaction and conscientiousness (Hypothesis 2a) and weakened by depression and neuroticism (Hypothesis 2b). Interoceptive awareness was person-mean centered to capture variability within-person. Life satisfaction, conscientiousness, depression, and neuroticism were grand-mean-centered. The interactions between each within-person dimension of interoceptive awareness and each individual difference measure were tested in separate models (e.g., within-person body noticing, grand-mean-centered life satisfaction, and their interaction were included in a model predicting emotional clarity). The same was done for predicting goal clarity. Because there were 24 models for each outcome (12 predicting emotional clarity and 12 predicting goal clarity), we corrected for multiple analyses by only interpreting significant associations with a p value of less than .005. The formulas for the models used are provided in Supplemental Equations S1–S2.

All analyses were conducted using R Studio Version 4.4.2 (RStudio Team, 2020). Between- and within-person correlations were calculated using the psych package (Revelle, 2024), which decomposes the Pearson correlations (which conflates covariation

Table 1

Descriptive Statistics for Measures of Trait Dimensions of Interoceptive Awareness, Personality, and Psychological Well-Being

Variable	<i>M (SD)</i>	Range
MAIA-2 subscales		
Body Noticing	3.17 (1.27)	0–6
Attention Regulation	2.85 (1.05)	0–6
Emotional Awareness	3.27 (1.26)	0–6
Self-Regulation	2.84 (1.24)	0–6
Body Listening	2.08 (1.25)	0–6
Body Trusting	3.34 (1.48)	0–6
Life Satisfaction	4.46 (1.45)	1–7
Conscientiousness	3.78 (0.70)	1–5
Depression	15.91 (6.43)	8–40
Neuroticism	2.73 (0.80)	1–5

Note. MAIA-2 = Multidimensional Assessment of Interoceptive Awareness Version 2.

due to groups and moments) into the pooled within-person correlations and a weighted between-person correlation following Pedhazur (1997). Multilevel modeling was conducted using the Lme4 and lmerTest packages (Bates et al., 2015; Kuznetsova et al., 2017). We calculated degrees of freedom using the Satterthwaite approximation and specified an unstructured variance-covariance structure. Past work has shown that when people are asked to monitor their emotions over time, it can impact the emotions they experience (Hollis et al., 2017). However, Eisele et al. (2023) tested whether monitoring emotions had an impact on emotional clarity during experience sampling and did not find systematic time effects. Therefore, we include supplemental analyses (Supplemental Tables S2–S5) and figures (Supplemental Figures S1–S3) using assessment period as a covariate and random effect to account for the possibility that being in the ESM study over time influenced people’s emotional and goal clarity. Each assessment period was calculated as the difference in time measured in seconds from the first assessment to the current assessment. Between-person associations are also available in Supplemental Tables S6 and S7.

Transparency and Openness

Data and R analysis code can be found at <https://osf.io/c93aw/>, and more information about the parent study can be found at <https://osf.io/7s6wn>. This study was not preregistered, but the senior author (RJT) obtained funding from the Office of The Provost at Washington University in St. Louis to examine interoceptive ability in daily life. Then, the study was expanded to allow for a variety of research questions to be adequately powered.

Results

Table 1 includes the means and standard deviation values of the dimensions of ESM interoceptive awareness. Table 2 provides the within- and between-person correlations for the study variables. At

the within-person level, the interoceptive awareness subscales were positively related but only to a small–moderate degree, suggesting they are similar but distinct constructs. At the between-person level, the examined moderators, life satisfaction, conscientiousness, depression, and neuroticism, were associated with emotional and goal clarity in directions consistent with extant literature. For example, depression and neuroticism were associated inversely with emotional clarity. Table 2 also includes the intraclass correlations for ESM items (calculated from one-way fixed-effects models) that indicate how much variability can be attributed to between-persons (vs. within-persons) sources.

Associations Between Momentary Interoceptive Awareness and Emotional and Goal Clarity

We hypothesized that momentary interoceptive awareness would be associated with greater emotional clarity (Hypothesis 1a). As predicted, across all dimensions, in moments when individuals had higher levels of interoceptive awareness, they reported greater emotional clarity. As shown in Table 3, when all dimensions of interoceptive awareness were entered as simultaneous predictors of emotional clarity, five of the six dimensions showed significant independent associations with emotional clarity. Greater levels of body noticing, attention regulation, emotional awareness, body listening, and body trusting relative to their own average were associated with greater emotional clarity. Only the interoceptive awareness dimension of self-regulation (i.e., using breath to reduce tension) was not associated with emotional clarity.

We also hypothesized that momentary interoceptive awareness would be associated with greater goal clarity (Hypothesis 1b). Across all dimensions, in moments when individuals had higher levels of interoceptive awareness, they reported greater goal clarity (see Table 2 for all correlations). Furthermore, when all dimensions of interoceptive awareness were entered as simultaneous predictors of goal clarity, we found that four of the six

Table 2

Between- and Within-Person Correlation Table of ESM Interoceptive Awareness, ESM Psychological Clarity, and Global Measures of Psychological Well-Being

Variable	M (SD)	ICC	1	2	3	4	5	6	7	8	9	10	11	12	
1. ESM Body Noticing	4.83 (1.21)	.49	—	.86***	.75***	.39***	.86***	.64***	.69***	.50***	.09	.14	-.16*	-.22**	
2. ESM Attention Regulation	4.56 (1.26)	.50	.42***	—	.85***	.49***	.92***	.49***	.60***	.45***	.06	.07	-.16*	-.14	
3. ESM Emotional Awareness	4.23 (1.29)	.47	.28***	.41***	—	.61***	.85***	.32***	.52***	.34***	-.01	.06	-.08	-.04	
4. ESM Self-Regulation	3.17 (1.42)	.52	.19***	.28***	.33***	—	.48***	.06	.19*	.10	-.15	-.09	.09	.02	
5. ESM Body Listening	4.62 (1.22)	.47	.42***	.49***	.36***	.25***	—	.55***	.62***	.47***	.08	.09	-.13	-.14	
6. ESM Body Trusting	5.54 (1.20)	.59	.34***	.21***	.14***	.07***	.26***	—	.63***	.54***	.27***	.24**	-.36***	-.42***	
7. ESM Emotional Clarity	3.99 (0.64)	.35	.28***	.28***	.24***	.11***	.27***	.27***	—	.63***	.19*	.15	-.32***	-.36***	
8. ESM Goal Clarity	5.31 (0.96)	.27	.13***	.11***	.13***	.10***	.15***	.16***	.26***	—	.14	.34***	-.27***	-.23**	
9. Life Satisfaction											—	.20**	-.50***	-.49***	
10. Conscientiousness													—	-.23**	
11. Depression														—	.55***
12. Neuroticism															—

Note. Mean and standard deviation are at the person level; between-person correlations are above the diagonal; within-person correlations are below the diagonal; associations between ESM variables and person-level variables reflect correlations among person-means of ESM variables with Life Satisfaction, Conscientiousness, Depression, and Neuroticism. ESM = experience sampling methodology; ICC = interclass correlation coefficient.

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

Table 3*Dimensions of ESM Interoceptive Awareness Predicting Emotional and Goal Clarity*

Variable	Emotional clarity					Random effect (<i>SD</i>)	Goal clarity					Random effect (<i>SD</i>)
	<i>b</i>	<i>SE</i>	95% CI	<i>t</i>	<i>p</i>		<i>b</i>	<i>SE</i>	95% CI	<i>t</i>	<i>p</i>	
Intercept	3.99	0.05	[3.90, 4.08]	83.17		.40 (.63)	5.31	0.07	[5.17, 5.45]	74.08		.86 (.93)
Body Noticing	0.07	0.01	[0.04, 0.09]	5.63	<.001	.01 (.10)	0.04	0.02	[0.00, 0.08]	1.96	.054	.01 (.12)
Attention Regulation	0.08	0.01	[0.06, 0.11]	7.27	<.001	.009 (.10)	0.01	0.02	[-0.02, 0.05]	0.71	.479	.01 (.12)
Emotional Awareness	0.07	0.01	[0.05, 0.09]	6.57	<.001	.009 (.10)	0.07	0.02	[0.04, 0.10]	4.42	<.001	.008 (.09)
Self-Regulation	-0.005	0.008	[-.02, 0.01]	-0.65	.513	.003 (.05)	0.06	0.02	[0.03, 0.09]	4.20	<.001	.008 (.09)
Body Listening	0.07	0.01	[0.05, 0.09]	6.34	<.001	.007 (.09)	0.09	0.02	[0.05, 0.13]	4.33	<.001	.03 (.16)
Body Trusting	0.12	0.01	[0.09, 0.15]	8.42	<.001	.02 (.13)	0.15	0.03	[0.10, 0.21]	5.91	<.001	.05 (.22)

Note. Significant effects are presented in bold. $N = 179$; observations = 8,594 for emotional clarity, 8,515 for goal clarity; for emotional clarity: *Marginal* $R^2 = .095$; *Conditional* $R^2 = .520$; random effect residual variance = .54 (.73); for goal clarity: *Marginal* $R^2 = .033$; *Conditional* $R^2 = .345$; random effect residual variance = 2.13 (1.46). ESM = experience sampling methodology; *SE* = standard error; CI = confidence interval.

dimensions showed significant independent associations with goal clarity. Greater levels of emotional awareness, self-regulation, body listening, and body trusting were associated with greater goal clarity (Table 3). The interoceptive awareness dimension of body noticing was marginally associated, and the dimension of attention regulation was not associated with goal clarity.

Life Satisfaction and Conscientiousness Moderating Links Between Momentary Interoceptive Awareness and Emotional and Goal Clarity

Life satisfaction moderated associations for certain dimensions of momentary interoceptive awareness and emotional clarity in the opposite direction of what we expected, such that positive links between interoceptive awareness and emotional clarity were weaker (not stronger) with increased life satisfaction (Figure 1). More specifically, positive associations between body noticing, attention regulation, and body listening with emotional clarity were weaker with increased life satisfaction. Conscientiousness moderated the association between the emotional awareness dimension of interoceptive awareness and emotional clarity (see Table 4) following the same pattern as life satisfaction.

We found a similar unexpected pattern for life satisfaction and conscientiousness moderating dimensions of interoceptive awareness and goal clarity (Figure 1). Positive associations between body noticing, attention regulation, and body listening with goal clarity were weaker with increased life satisfaction. Conscientiousness also moderated associations for three out of six dimensions of interoceptive awareness with goal clarity (Figure 2) where positive associations between attention regulation, emotional awareness, and self-regulation with goal clarity were weaker with higher conscientiousness (see Table 5).

Depression and Neuroticism Moderating Links Between Momentary Interoceptive Awareness and Emotional and Goal Clarity

Depression and neuroticism moderated associations for certain dimensions of momentary interoceptive awareness in the opposite direction of what we expected, such that positive links between interoceptive awareness and emotional clarity were stronger among individuals high in depression and neuroticism. Depression

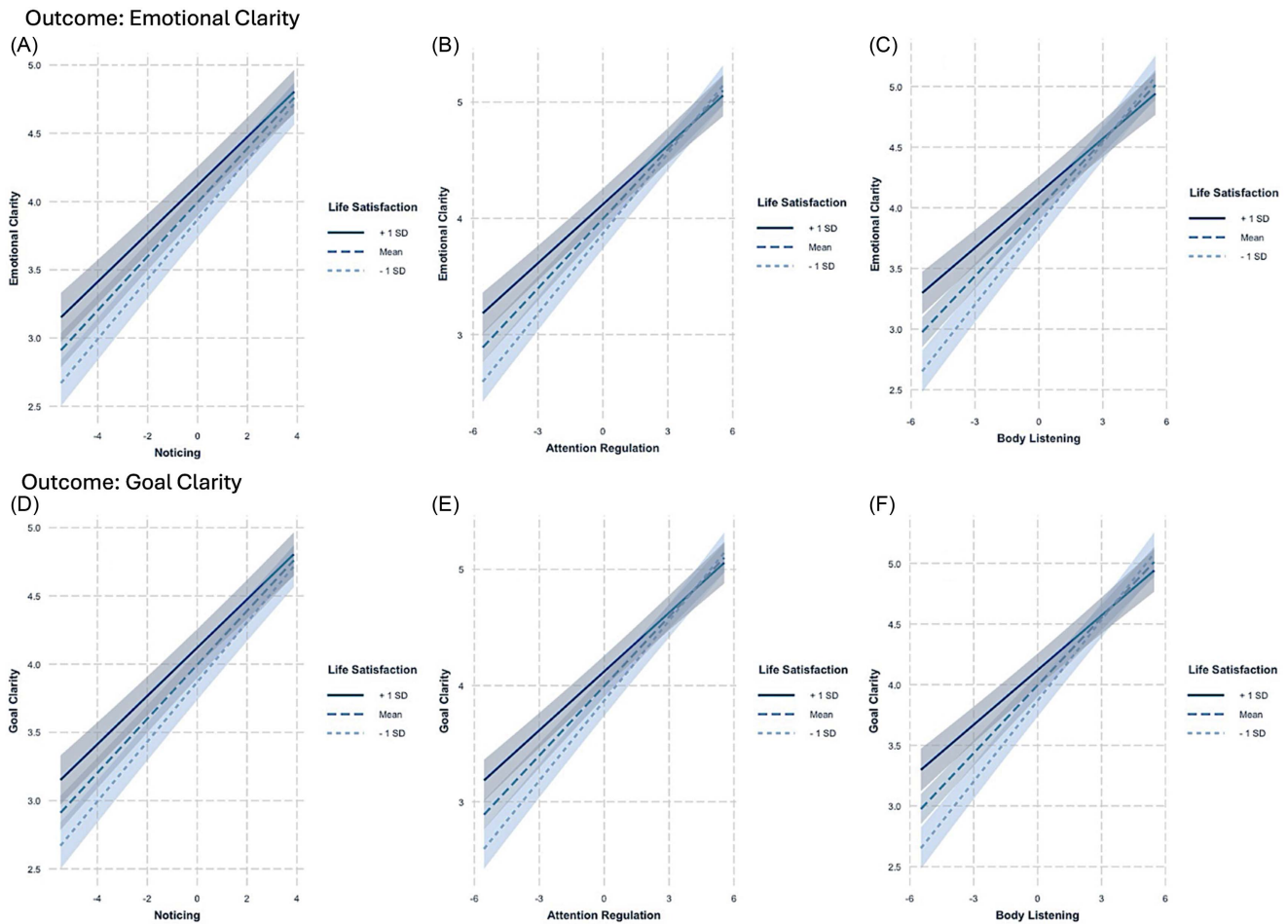
moderated associations for three out of the six dimensions of interoceptive awareness with emotional clarity (Figure 3). Positive associations between attention regulation, emotional awareness, and self-regulation with emotional clarity were stronger among individuals with higher levels of depression. Similarly, neuroticism moderated associations for four out of six dimensions of interoceptive awareness with emotional clarity (Figure 4). Positive associations between attention regulation, emotional awareness, self-regulation, and body listening with emotional clarity were also weaker among individuals with higher neuroticism (see Table 4).

Similarly, we found an unexpected pattern for depression and neuroticism moderating dimensions of interoceptive awareness and goal clarity (Figures 3 and 4). Positive associations between self-regulation with goal clarity were stronger with higher levels of depression. Neuroticism moderated associations for four out of six dimensions of interoceptive awareness with goal clarity. Positive associations between attention regulation, emotional awareness, self-regulation, and body listening with goal clarity were stronger with higher neuroticism (see Table 5 for all results).

Discussion

Evidence suggests there are no associations between interoceptive awareness and emotional and goal clarity at the trait level (Trevisan et al., 2019). However, there are many theories around the production of emotions that would suggest an association between these variables would in fact exist (e.g., constructionist views of emotion). Our use of ESM allowed us to use a within-person approach to examine the potential associations between interoceptive awareness with emotional and goal clarity and whether several individual differences moderated these associations.

Across all analyses, at least half (and in several cases, all) the facets of interoceptive awareness showed similar patterns to one another. Since the facets were adapted from the MAIA-2 (Mehling et al., 2018) that tends to tap more positive aspects of interoceptive processing (Desmedt et al., 2022), it is possible that our results are indicating associations between a latent positive interoceptive awareness process and psychological clarity. As predicted, all dimensions of interoceptive awareness were positively associated with both emotional and goal clarity in daily life. In moments where an individual is experiencing greater interoceptive awareness, they also reported greater momentary psychological clarity. This suggests that greater awareness of internal states might

Figure 1*Life Satisfaction Moderates Associations Between Interoceptive Awareness and Clarity*

Note. (A) depicts the cross-level interaction between experience sampling methodology (ESM) Noticing and Life Satisfaction in predicting ESM Emotional Clarity; (B) depicts the cross-level interaction between ESM Attention Regulation and Life Satisfaction in predicting ESM Emotional Clarity; (C) depicts the cross-level interaction between ESM Body Listening and Life Satisfaction in predicting ESM Emotional Clarity; (D) depicts the cross-level interaction between ESM Noticing and Life Satisfaction in predicting ESM Goal Clarity; (E) depicts the cross-level interaction between ESM Attention Regulation and Life Satisfaction in predicting ESM Goal Clarity; (F) depicts the cross-level interaction between ESM Body Listening and Life Satisfaction in predicting ESM Goal Clarity. Solid lines show the association between interoception and clarity at 1 *SD* above the mean for Life Satisfaction; dashed lines show the association between interoception and clarity at the mean level of Life Satisfaction; dotted lines show the association between interoception and clarity at 1 *SD* below the mean for Life Satisfaction. See the online article for the color version of this figure.

allow individuals to be more responsive to these states, leading to more motivated cognition to understand and clarify their goals (Ferrario et al., 2016; Hepach et al., 2019; Quigley et al., 2021). Although individuals with high interoceptive awareness may not be more likely to have greater psychological clarity (Trevisan et al., 2019), the present study presents evidence that in moments when individuals are more interoceptively aware, they are more psychologically clear. Thus, it is important to understand the situations and contexts in which people may be more interoceptively aware because this may allow for the cultivation of emotional and goal clarity.

These findings provide further evidence that one's physical body can serve as a constitutive part of one's emotional experiences (e.g., Barrett & Russell, 2015; Cunningham et al., 2013; Lindquist, 2013; Storbeck & Clore, 2008). The process of knowing and identifying

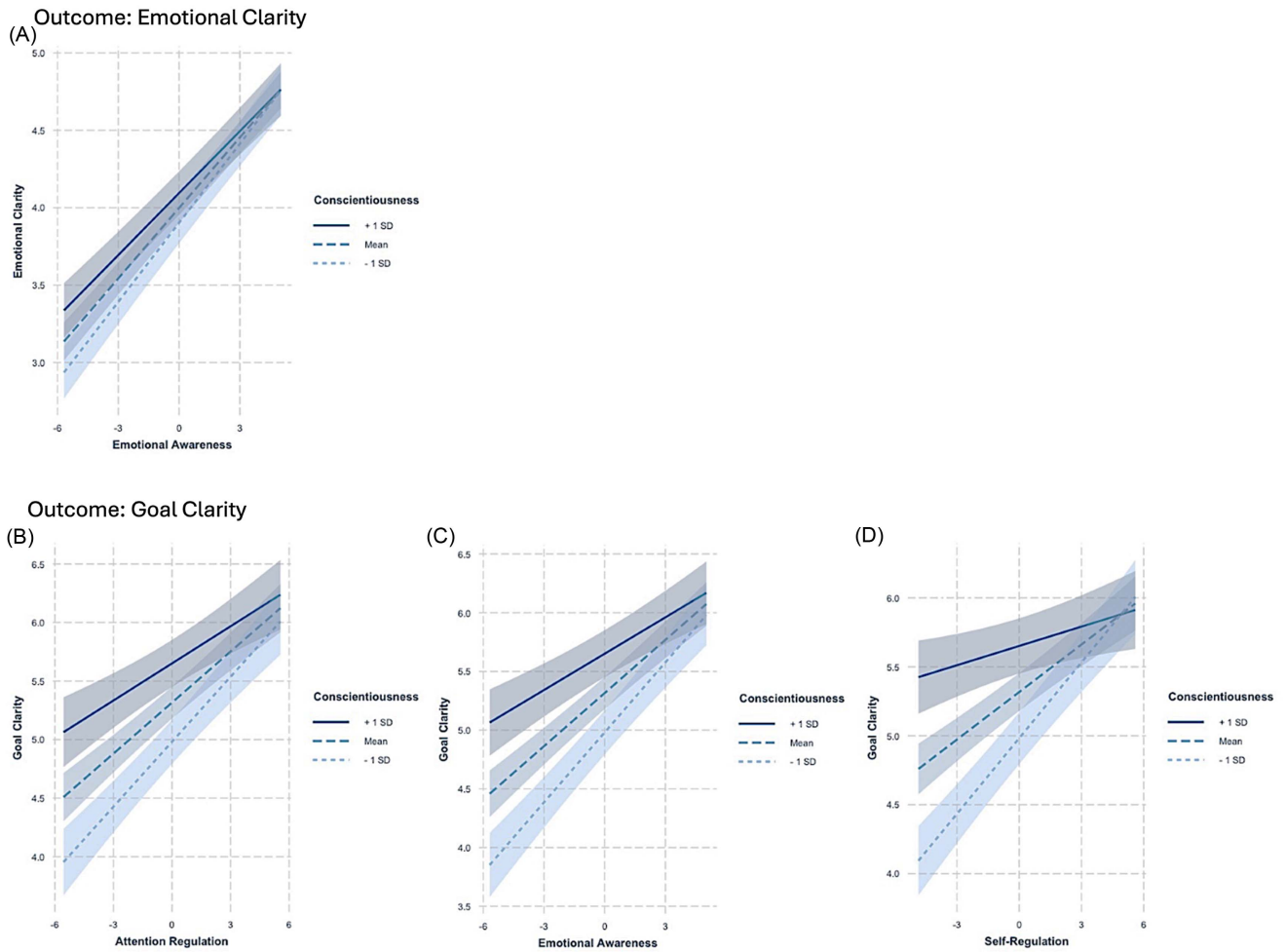
one's emotions may involve not only a person's conceptual understanding of emotions (e.g., emotion categories, prior experiences; Lindquist et al., 2012) but also the information acquired from noticing one's own physiological state (Barrett & Russell, 2015). This is consistent with research conceptualizing the brain as a predictive organ which uses both prior knowledge and ongoing information being received from the body to make interpretations about the world (Barrett & Simmons, 2015; Chanes & Barrett, 2016). Meta-analyses of neuroimaging studies also support this theory, providing evidence that several brain regions (e.g., insula and anterior insular cortex) that are associated with body sensations are also active while one is experiencing emotions (Avery et al., 2014; Kober et al., 2008; Lindquist et al., 2012). Research has also found that experimentally changing bodily experiences (e.g.,

Table 4
Multilevel Models Testing Moderated Associations Between Dimensions of Interoceptive Awareness and Emotional Clarity

	Moderator A: Life satisfaction			Moderator B: Depression			Moderator C: Conscientiousness			Moderator D: Neuroticism		
	Estimate	SE	95% CI	p	Estimate	SE	95% CI	p	Estimate	SE	95% CI	p
Dimension 1												
Intercept	3.99	.05	[3.89, 4.08]	<.001	3.99	.047	[3.90, 4.08]	<.001	3.99	.046	[3.90, 4.08]	<.001
Moderator	0.088	.034	[0.02, 0.15]	.01	-0.033	.007	[-0.05, -0.02]	<.001	0.138	.07	[0.00, 0.28]	.043
Body Noticing	0.199	.008	[0.18, 0.21]	<.001	0.20	.008	[0.18, 0.21]	<.001	0.20	.008	[0.18, 0.21]	<.001
Body Noticing × Moderator	-0.015	.005	[-0.02, 0.00]	.004	0.003	.001	[0.00, 0.01]	.006	-0.005	.011	[-0.03, 0.02]	.605
Dimension 2												
Intercept	3.99	.05	[3.90, 4.09]	<.001	3.99	.047	[3.90, 4.08]	<.001	3.99	.049	[3.90, 4.09]	<.001
Moderator	0.088	.034	[0.02, 0.15]	.01	-0.033	.007	[-0.05, -0.02]	<.001	0.138	.07	[0.00, 0.28]	.052
Attention Regulation	0.20	.007	[0.19, 0.21]	<.001	0.199	.007	[0.18, 0.21]	<.001	0.199	.007	[0.18, 0.21]	<.001
Attention Regulation × Moderator	-0.021	.005	[-0.03, -0.01]	<.001	0.004	.001	[0.00, 0.01]	<.001	-0.023	.01	[-0.04, 0.00]	.03
Dimension 3												
Intercept	3.99	.05	[3.89, 4.08]	<.001	3.99	.047	[3.90, 4.08]	<.001	3.99	.046	[3.90, 4.08]	<.001
Moderator	0.088	.034	[0.02, 0.15]	.01	-0.033	.007	[-0.05, -0.02]	<.001	0.137	.071	[0.00, 0.28]	.054
Emotional Awareness	0.155	.007	[0.14, 0.17]	<.001	0.153	.007	[0.14, 0.17]	<.001	0.153	.007	[0.14, 0.17]	<.001
Emotional Awareness × Moderator	-0.012	.005	[-0.02, 0.00]	.015	0.005	.001	[0.00, 0.01]	<.001	-0.026	.009	[-0.04, -0.01]	.005
Dimension 4												
Intercept	3.99	.049	[3.89, 4.08]	<.001	3.99	.047	[3.90, 4.08]	<.001	3.99	.049	[3.90, 4.09]	<.001
Moderator	0.088	.034	[0.02, 0.15]	.009	-0.033	.007	[-0.05, -0.02]	<.001	0.138	.07	[0.00, 0.28]	.053
Self-Regulation	0.072	.007	[0.06, 0.09]	<.001	0.073	.007	[0.06, 0.09]	<.001	0.073	.007	[0.06, 0.09]	<.001
Self-Regulation × Moderator	-0.011	.005	[-0.02, 0.00]	.02	0.004	.001	[0.00, 0.01]	<.001	-0.016	.01	[-0.04, 0.00]	.092
Dimension 5												
Intercept	3.99	.05	[3.89, 4.09]	<.001	3.99	.047	[3.90, 4.08]	<.001	3.99	.046	[3.90, 4.08]	<.001
Moderator	0.088	.034	[0.02, 0.15]	.01	-0.033	.007	[-0.05, -0.02]	<.001	0.138	.07	[0.00, 0.28]	.052
Body Listening	0.187	.007	[0.17, 0.20]	<.001	0.186	.007	[0.17, 0.20]	<.001	0.186	.007	[0.17, 0.20]	<.001
Body Listening × Moderator	-0.025	.005	[-0.03, -0.02]	<.001	0.002	.001	[0.00, 0.00]	.079	-0.005	.01	[-0.02, 0.02]	.662
Dimension 6												
Intercept	3.99	.049	[3.89, 4.08]	<.001	3.99	.047	[3.90, 4.08]	<.001	3.99	.046	[3.90, 4.08]	<.001
Moderator	0.088	.034	[0.02, 0.15]	.01	-0.033	.007	[-0.05, -0.02]	<.001	0.138	.07	[0.00, 0.28]	.052
Trust	0.235	.009	[0.22, 0.25]	<.001	0.237	.009	[0.22, 0.25]	<.001	0.237	.009	[0.22, 0.25]	<.001
Body Trusting × Moderator	-0.007	.007	[-0.02, 0.01]	.156	-0.001	.001	[0.00, 0.00]	.358	0.022	.013	[0.00, 0.05]	.103

Note. Significant effects are presented in bold. SE = standard error; CI = confidence interval.

Figure 2
Conscientiousness Moderates Associations Between Interoceptive Awareness and Clarity



Note. (A) depicts the cross-level interaction between experience sampling methodology (ESM) Emotional Awareness and Conscientiousness in predicting ESM Emotional Clarity; (B) depicts the cross-level interaction between ESM Attention Regulation and Conscientiousness in predicting ESM Goal Clarity; (C) depicts the cross-level interaction between ESM Emotional Awareness and Conscientiousness in predicting ESM Goal Clarity; (D) depicts the cross-level interaction between ESM Self-Regulation and Conscientiousness in predicting ESM Goal Clarity. Solid lines show the association between interoception and goal clarity at 1 SD above the mean for Conscientiousness; dashed lines show the association between interoception and goal clarity at the mean level of Conscientiousness; dotted lines show the association between interoception and clarity at 1 SD below the mean for Conscientiousness. See the online article for the color version of this figure.

fabricated cardiac feedback) can influence one’s perception of their emotional arousal (Gray et al., 2012). Physiological and neuroimaging research have found associations between motivation and emotion too. Specifically, the amygdala and the insular and anterior cortex have been associated with motivation in addition to emotional experiences (Barrett & Russell, 2015; Wager & Barrett, 2017). Given the relatedness of motivation and emotion, it is reasonable that goal clarity, though understudied, may operate similarly to emotional clarity.

Contrary to hypotheses and expectations, life satisfaction and conscientiousness weakened the association between interoceptive awareness and psychological clarity, while neuroticism and depression strengthened it. Research has shown that individuals experience more physiological arousal while engaging in an activity that is

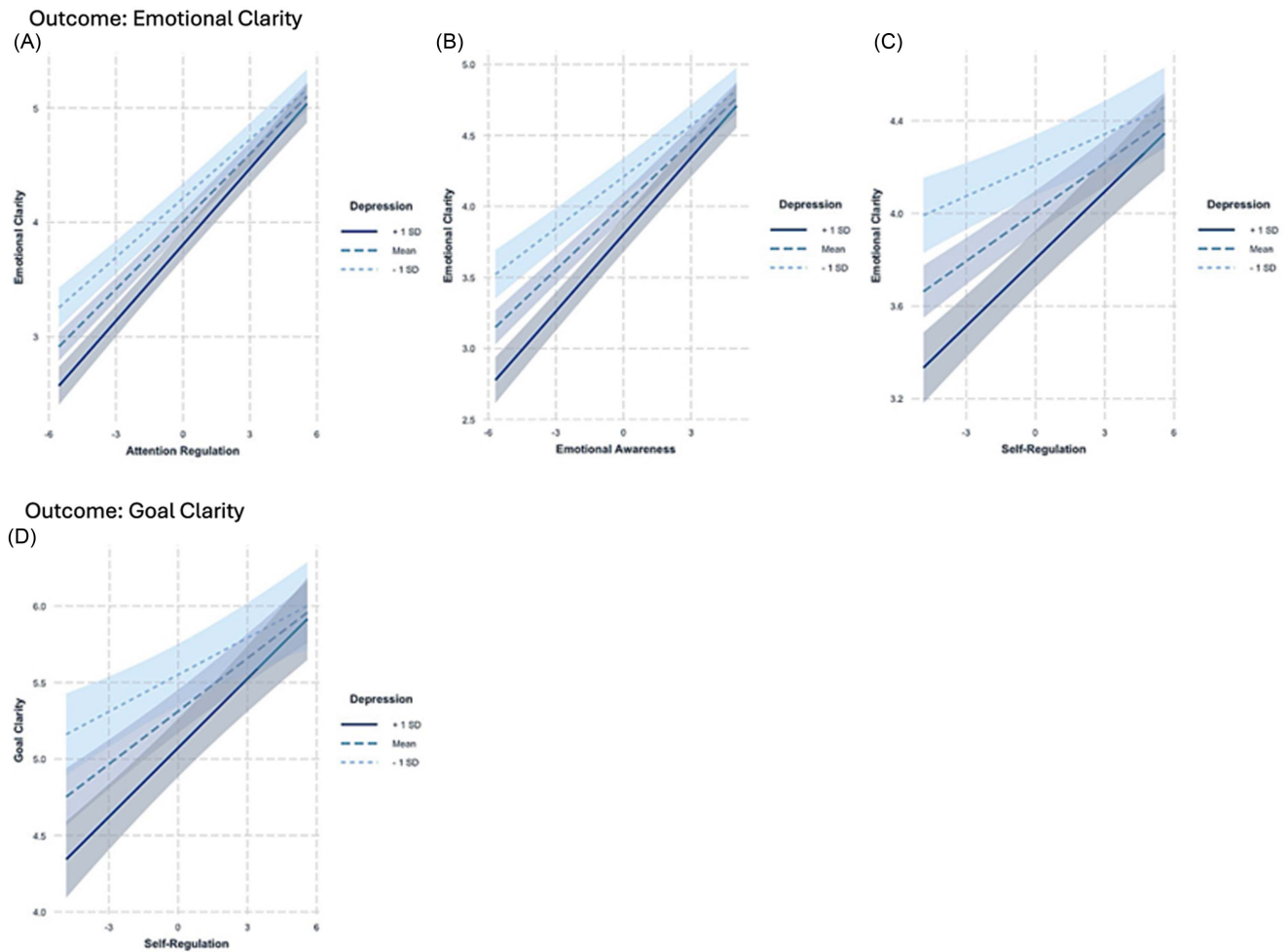
difficult (cf. easy; e.g., Gellatly & Meyer, 1992). Perhaps when individuals experience greater depression or increased neuroticism, the process of generating momentary goals becomes more difficult, especially compared to individuals that are high in life satisfaction or conscientiousness. Thus, they may experience greater physiological arousal which becomes more attentionally salient, influencing the individual to tune into their body more so than they normally would.

These unexpected findings may also be explained using a top-down versus bottom-up processing framework. As has been discussed, the constructionist theory of emotion considers the combination of both emotional knowledge from previous experience and one’s own bodily sensations as required to produce an emotion (MacCormack & Lindquist, 2017). As such, it is possible that individual differences influence the weight of these two factors in the cognitive production

Table 5
Multilevel Models Testing Moderated Associations Between Dimensions of Interoceptive Awareness and Goal Clarity

	Moderator A: Life satisfaction			Moderator B: Depression			Moderator C: Conscientiousness			Moderator D: Neuroticism						
	Estimate	SE	95% CI	p	Estimate	SE	95% CI	p	Estimate	SE	95% CI	p	Estimate	SE	95% CI	p
Dimension 1																
Intercept	5.29	.073	[5.15, 5.44]	<.001	5.29	.072	[5.15, 5.44]	<.001	5.29	.07	[5.16, 5.43]	<.001	5.30	.073	[5.15, 5.44]	<.001
Moderator	0.101	.051	[0.00, 0.20]	.051	-0.039	.011	[-0.06, -0.02]	<.001	0.477	.10	[0.28, 0.67]	<.001	-0.276	.09	[-0.45, -0.10]	.003
Body Noticing	0.163	.014	[0.14, 0.19]	<.001	0.165	.014	[0.14, 0.19]	<.001	0.168	.014	[0.14, 0.20]	<.001	0.165	.014	[0.14, 0.19]	<.001
Body Noticing × Moderator	-0.031	.010	[-0.05, -0.01]	.002	0.0001	.002	[0.00, 0.00]	.950	-0.053	.020	[-0.09, -0.01]	.009	0.035	.018	[0.00, 0.07]	.052
Dimension 2																
Intercept	5.29	.074	[5.15, 5.44]	<.001	5.29	.072	[5.15, 5.44]	<.001	5.29	.07	[5.16, 5.43]	<.001	5.30	.073	[5.15, 5.44]	<.001
Moderator	0.101	.051	[0.00, 0.20]	.051	-0.039	.011	[-0.06, -0.02]	<.001	0.478	.10	[0.28, 0.68]	<.001	-0.277	.091	[-0.46, -0.10]	.003
Attention Regulation	0.148	.014	[0.12, 0.18]	<.001	0.148	.014	[0.12, 0.18]	<.001	0.148	.014	[0.12, 0.18]	<.001	0.148	.014	[0.12, 0.18]	<.001
Attention Regulation × Moderator	-0.035	.010	[-0.05, -0.02]	<.001	0.005	.002	[0.00, 0.01]	.028	-0.057	.020	[-0.10, -0.02]	.004	0.085	.018	[0.05, 0.12]	<.001
Dimension 3																
Intercept	5.29	.074	[5.15, 5.44]	<.001	5.29	.072	[5.15, 5.44]	<.001	5.29	.07	[5.16, 5.43]	<.001	5.30	.073	[5.15, 5.44]	<.001
Moderator	0.102	.051	[0.00, 0.20]	.049	-0.039	.011	[-0.06, -0.02]	<.001	0.478	.10	[0.28, 0.68]	<.001	-0.277	.091	[-0.45, -0.10]	.003
Emotional Awareness	0.154	.013	[0.13, 0.18]	<.001	0.152	.013	[0.13, 0.18]	<.001	0.154	.013	[0.13, 0.18]	<.001	0.154	.013	[0.13, 0.18]	<.001
Emotional Awareness × Moderator	-0.021	.009	[-0.04, 0.00]	.021	0.005	.002	[0.00, 0.01]	.012	-0.068	.018	[-0.10, -0.03]	<.001	0.055	.017	[0.02, 0.09]	.001
Dimension 4																
Intercept	5.29	.074	[5.15, 5.44]	<.001	5.29	.072	[5.15, 5.44]	<.001	5.29	.07	[5.16, 5.43]	<.001	5.30	.073	[5.15, 5.44]	<.001
Moderator	0.101	.051	[0.00, 0.20]	.051	-0.039	.011	[-0.06, -0.02]	<.001	0.478	.10	[0.28, 0.67]	<.001	-0.276	.091	[-0.45, -0.10]	.003
Self-Regulation	0.117	.013	[0.09, 0.14]	<.001	0.118	.013	[0.09, 0.14]	<.001	0.12	.013	[0.09, 0.14]	<.001	0.119	.013	[0.09, 0.14]	<.001
Self-Regulation × Moderator	-0.016	.009	[-0.03, 0.00]	.071	0.006	.002	[0.00, 0.01]	.005	-0.097	.018	[-0.13, -0.06]	<.001	0.074	.016	[0.04, 0.11]	<.001
Dimension 5																
Intercept	5.29	.073	[5.14, 5.43]	<.001	5.29	.072	[5.15, 5.44]	<.001	5.29	.07	[5.16, 5.43]	<.001	5.30	.073	[5.15, 5.44]	<.001
Moderator	0.102	.051	[0.00, 0.20]	.048	-0.039	.011	[-0.06, -0.02]	<.001	0.479	.10	[0.28, 0.68]	<.001	-0.276	.091	[-0.45, -0.10]	.003
Body Listening	0.181	.014	[0.15, 0.21]	<.001	0.184	.014	[0.16, 0.21]	<.001	0.186	.014	[0.16, 0.21]	<.001	0.187	.014	[0.16, 0.21]	<.001
Body Listening × Moderator	-0.03	.009	[-0.05, -0.01]	.001	0.006	.002	[0.00, 0.01]	.011	-0.053	.019	[-0.09, -0.01]	.006	0.082	.018	[0.05, 0.12]	<.001
Dimension 6																
Intercept	5.29	.074	[5.14, 5.43]	<.001	5.29	.072	[5.15, 5.44]	<.001	5.29	.07	[5.16, 5.43]	<.001	5.30	.073	[5.15, 5.44]	<.001
Moderator	0.101	.051	[0.00, 0.20]	.051	-0.039	.011	[-0.06, -0.02]	<.001	0.477	.10	[0.28, 0.67]	<.001	-0.276	.091	[-0.45, -0.10]	<.001
Trust	0.247	.018	[0.21, 0.28]	<.001	0.254	.018	[0.22, 0.29]	<.001	0.25	.018	[0.22, 0.28]	<.001	0.254	.018	[0.22, 0.29]	.003
Trust × Moderator	-0.021	.012	[-0.05, 0.00]	.089	-0.003	.003	[-0.01, 0.00]	.247	-0.044	.025	[-0.09, 0.00]	.078	-0.019	.023	[-0.06, 0.03]	.397

Note. Significant effects are presented in bold. SE = standard error; CI = confidence interval.

Figure 3*Depression Moderates Associations Between Interoceptive Awareness and Clarity*

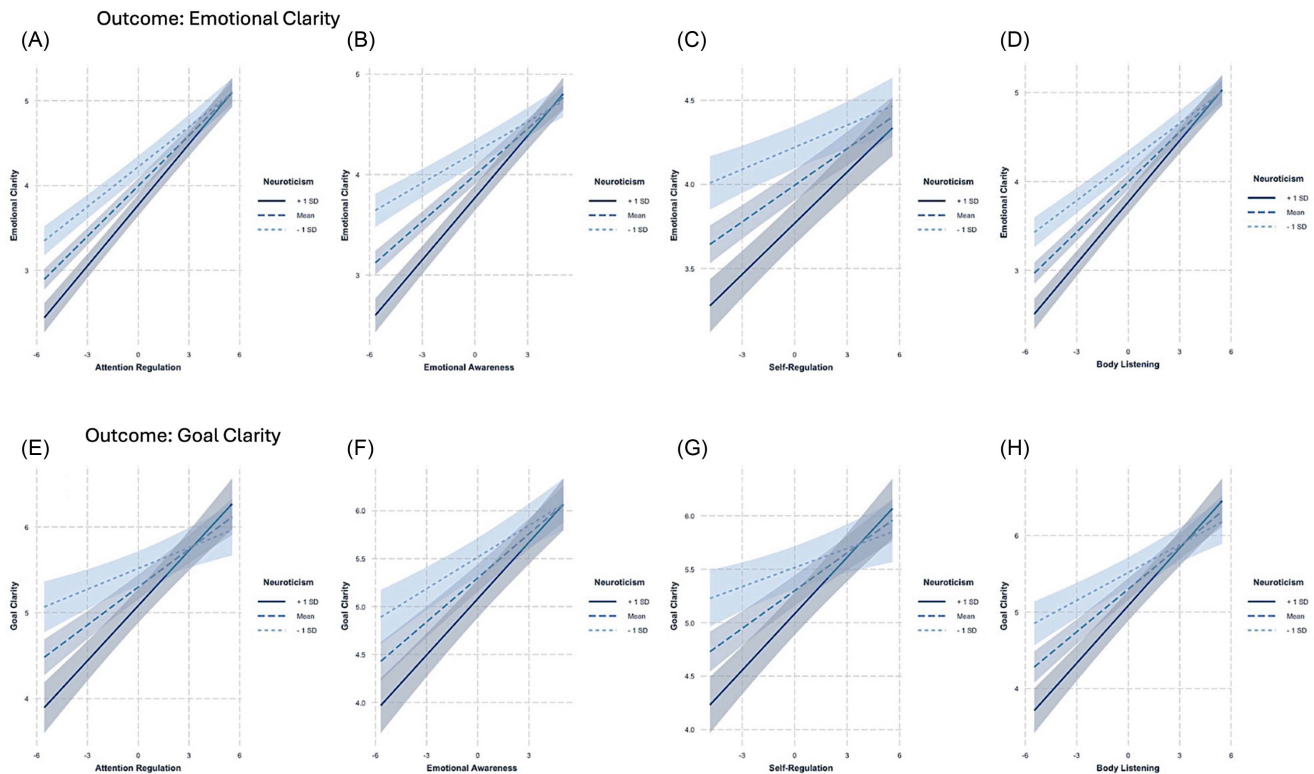
Note. (A) depicts the cross-level interaction between experience sampling methodology (ESM) Attention Regulation and Depression in predicting ESM Emotional Clarity; (B) depicts the cross-level interaction between ESM Emotional Awareness and Depression in predicting ESM Emotional Clarity; (C) depicts the cross-level interaction between ESM Self-Regulation and Depression in predicting ESM Emotional Clarity; (D) depicts the cross-level interaction between ESM Self-Regulation and Depression in predicting ESM Goal Clarity. Solid lines show the association between interoception and clarity at 1 *SD* above the mean for Depression; dashed lines show the association between interoception and clarity at the mean level of Depression; dotted lines show the association between interoception and clarity at 1 *SD* below the mean for Depression. See the online article for the color version of this figure.

of an emotion. For example, if someone is high in neuroticism or depression, they may not have the language to explain an emotional experience to themselves, so perhaps they instead rely on bodily cues to ascertain this information (i.e., bottom-up processing). Similarly, depression and emotional distress carry a high cognitive load (Bredemeier et al., 2012), which may inhibit the ability to mentally represent abstract emotional experiences verbally, so individuals may look for more concrete sources of information such as bodily sensations. Conversely, since various indices of well-being are associated with greater cognitive resources (Hawthorne et al., 2019), it follows that if someone is high in conscientiousness or life satisfaction, they may also have greater capacity to construct mental representations of emotions using emotion knowledge and past experience. Thus, through a top-down process, they may experience a lesser need to rely on their bodies for emotional cues. A

person's production of goals may work in a similar way, where if a person's goals are typically thought out well in advance, they may not rely on bodily cues as much as if they were producing goals on a more momentary basis.

This theory of bottom-up and top-down processing is further supported by research finding cognitive deficits, including diminished executive function, in individuals who report themselves as being more neurotic (e.g., Boyle et al., 2010; Robinson & Tamir, 2005) or having elevated depression (for a review, see Snyder, 2013). Through the lens of the constructionist theory of emotion, diminished executive functioning may interrupt a key component of emotion generation and clarity: the working memory involved in the utilization of past experiences and emotion understanding (MacCormack & Lindquist, 2017). Meanwhile, there is work to support greater cognitive abilities being associated with greater life

Figure 4
Neuroticism Moderates Associations Between Interoceptive Awareness and Clarity



Note. (A) depicts the cross-level interaction between experience sampling methodology (ESM) Attention Regulation and Neuroticism in predicting ESM Emotional Clarity; (B) depicts the cross-level interaction between ESM Emotional Awareness and Neuroticism in predicting ESM Emotional Clarity; (C) depicts the cross-level interaction between ESM Self-Regulation and Neuroticism in predicting ESM Emotional Clarity; (D) depicts the cross-level interaction between ESM Body Listening and Neuroticism in predicting ESM Emotional Clarity; (E) depicts the cross-level interaction between ESM Attention Regulation and Neuroticism in predicting ESM Goal Clarity; (F) depicts the cross-level interaction between ESM Emotional Awareness and Neuroticism in predicting ESM Goal Clarity; (G) depicts the cross-level interaction between ESM Self-Regulation and Neuroticism in predicting ESM Goal Clarity; (H) depicts the cross-level interaction between ESM Body Listening and Neuroticism in predicting ESM Goal Clarity. Solid lines show the association between interoception and clarity at 1 *SD* above the mean for Neuroticism; dashed lines show the association between interoception and clarity at the mean level of Neuroticism; dotted lines show the association between interoception and clarity at 1 *SD* below the mean for Neuroticism. See the online article for the color version of this figure.

satisfaction (Enkvist et al., 2013) and conscientiousness (Rikoon et al., 2016). Given goal clarity and emotional clarity are each associated with numerous psychological benefits (Eckland & Berenbaum, 2021, 2023; Emmons, 1986; Park & Naragon-Gainey, 2019), these findings provide further evidence regarding the impact of individual differences in influencing a person's daily well-being.

The results of the present study suggest interoceptive awareness may be less important for individuals high in traits associated with greater well-being (life satisfaction and conscientiousness). However, it may be important for individuals high in traits associated with lower well-being (i.e., depression and neuroticism) when aiming to create clear representations of what they feel and what they aim to accomplish. Future work will need to clarify the directionality of these associations, but the present study may suggest using mind-body interventions (e.g., mindfulness-based cognitive therapy; Segal et al., 2002) for depression to improve emotional and goal clarity. Our results raise the possibility that interventions could be enhanced for individuals who are more

depressed (or more neurotic) by intentionally using intervention components (e.g., inquiry after mindfulness practice) to help participants draw connections between their body sensations and their understanding of what they feel and their goals.

Limitations and Future Directions

Although our findings offer exciting future directions in understanding intraindividual fluctuations in interoceptive awareness and its links with emotional and psychological well-being, the present study was correlational, and analyses were contemporaneous. Therefore, we cannot be certain of the directionality of the associations between interoceptive awareness and psychological clarity. We did not examine lagged effects because the time between most assessments was approximately 3 hr, which is likely too long of a window to capture how interoception and mental representations of emotions and goals may shape each other. Experimental research is needed to establish causality and certainty about the

temporal ordering of these processes. It is also possible that greater awareness of bodily signals may not always be better (e.g., too much focus on body sensations distracting from one's goals or emotions). In other words, future research should investigate whether some associations between interoceptive awareness and psychological clarity may be nonlinear. Additionally, experimentally manipulating awareness of internal sensations may further clarify the degree to which individuals with varying trait-like characteristics are aware of their bodily cues and use them to inform and clarify their current emotions or goals (e.g., Leong et al., 2015).

The present study assessed all constructs using self-reported measures, which limits interpretations to participants' perceptions. It is possible that some of the observed covariances between items may be partially inflated by construct overlap. For example, a participant may have responded similarly to items about "having clear emotions" and "noticing where you feel emotions" simply because the language is similar. However, at the within-person level, we found most of the intercorrelations among interoception facets, goal clarity, and emotional clarity were rather modest, making it unlikely that our results solely reflect construct overlap. This concern could be further mitigated in future research by collecting indirect measures of the constructs of interest. For example, ambulatory response latencies to emotion ratings can be used to infer emotional clarity (Lischetzke et al., 2011) or multimodal measures of interoceptive sensibility could be utilized (e.g., combining measures of interoceptive accuracy and interoceptive sensibility; Murphy et al., 2019). Finally, the MAIA-2, which our ESM items were adapted from, tends to tap into positive processing of bodily signals (rather than focus on visceral discomfort or unpleasant sensations associated with emotions like anxiety; Desmedt et al., 2022), so our results should not be interpreted as "global interoception" being associated with psychological clarity. Given inconsistencies in which interoceptive processes different measures tap into (see Desmedt et al., 2022, for discussion about self-report measures; see Ferentzi, Drew, et al., 2018, for discussion of accuracy measures), our results will be most comparable with other studies examining interoceptive awareness with measures such as the MAIA-2 (Mehling et al., 2018).

The present study sought to understand associations between emotional and goal clarity, interoceptive awareness, and the individual differences that may impact these associations. The use of ESM extends research in this area by providing a granular look into the daily lives of individuals. Findings present evidence of the positive association between interoceptive awareness and forms of psychological clarity. However, results also demonstrate that individual differences are associated with these relationships in unexpected ways. These findings shed light on the intricate mechanisms underlying how individuals both understand and interpret their emotions and goals.

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Received July 4, 2024

Revision received December 24, 2024

Accepted January 7, 2025 ■