



Original article

Exploring psychosomatic congruence: The effect of focusing on body parts as a body-oriented mentalization process

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ABSTRACT

Background/Objective: Patients with somatic symptoms are considered to have a deficiency in body-oriented mentalization; that is, the ability to perceive and interpret bodily sensations in relation to psychological states. We introduce the novel concept of psychosomatic congruence—the alignment of physical sensations with cognition and emotional states, which leads to behaviors that synchronize physical manifestations with emotional experiences and internal reflections. Despite its clinical relevance, this concept has not been empirically examined. Three experiments investigated the effects of psychosomatic congruence on the mental content of associations, autobiographical memories, and the accessibility of negative-related words. Grounded in theories of embodied cognition and interoception, we hypothesized that psychosomatic congruence could be facilitated through an initiated interoceptive task.

Methods: Three pre-registered experiments involving 318 participants were conducted. Participants were asked to identify and label their most pleasant and unpleasant body parts, and then engaged in tasks involving associations with neutral words, memory retrieval, and the accessibility of negative-related words under varying conditions of mortality salience.

Results: Focusing on the most pleasant body part, as compared to the most unpleasant, led to more positive associations with neutral words, enhanced positive memory retrieval, and reduced accessibility of negatively related words.

Conclusions: These findings provide evidence that initiating an interoceptive task by focusing attention on body parts can induce congruent mental content. They offer insights into body-oriented mentalization and suggest that emotional distress may potentially be regulated by deliberately focusing on pleasant body parts.

Introduction

Although numerous studies have examined the congruence between emotion and cognition (Bower, 1981; Faul & LaBar, 2022), psychosomatic congruence remains understudied. Research on body-oriented mentalization suggests that psychosomatic congruence can be seen as the embodiment of emotional integrity, where individuals' words, emotions, and physical signals are seamlessly integrated and present a unified representation of their inner world. Defined as the alignment between internal mental states and external bodily expressions, psychosomatic congruence is one of the key observable components of body-oriented mentalization (Huisman, 2017; Spaans et al., 2010).

Studies on the congruence between somatic and emotional states suggest that individuals can heighten their awareness of somatic,

emotional, and cognitive processes by integrating interoceptive cues that can foster adaptive self-regulation (Fotopoulou & Tsakiris, 2017). However, despite the clinical relevance of this notion for the development of body oriented mentalization, to the best of our knowledge, no empirical research has been conducted on psychosomatic congruence. There is evidence that the association between emotional experiences and bodily states influences emotional perception (Niedenthal, 2007). By contrast, the dissociation between somatic symptoms, traumatic memories and emotional states leads to maladaptive self-regulation (Shalev, 2020, 2021).

Awareness of psychosomatic congruence can facilitate the development of a higher level of emotional awareness and a more integrative understanding of complex emotional states (Lane & Schwartz, 1987), which is crucial for individuals with severe medically unexplained

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symptoms (MUS) (Luyten et al., 2012). Likewise, focusing on bodily sensations and their connection to semantic content can aid in healing trauma (Garfinkel et al., 2015).

Interoception, which is defined as the perception of internal bodily sensations, is closely associated with psychosomatic congruence. The capacity to perceive and understand internal bodily sensations, known as interoceptive awareness (Garfinkel et al., 2015), influences individuals' ability to express their feelings and can lessen the effects of negative emotional experiences in daily life. Conversely, individuals with diminished interoceptive abilities (Cameron, 2001), face increased challenges in verbalizing their feelings and may experience a dampening of emotions when confronted with negative experiences (Zamariola et al., 2019). Evidence suggests that a deficiency in interoceptive awareness can contribute to emotional disorders (Paulus & Stein, 2010; Khalsa & Lapidus, 2016; Murphy et al., 2018). Physiological changes induced by stress and trauma further influence emotional experiences and related internal processes (Lupien et al., 2009; Ellis et al., 2011a, 2011b). Thus, enhancing interoceptive awareness through initiating interoceptive tasks may potentially facilitate the use of psychosomatic congruence to regulate emotional states. Although the different dimensions of interoception have been researched, the initiated experience of interoception can contribute to emotional regulation was understudied. One possible way to achieve this may be by focusing on pleasant body parts or accessing and mentalizing the connection between physical sensations and mental content such as autobiographic memories or associations.

Research indicates that the association between bodily sensations and emotional labelling hinges on contextual knowledge that enables a higher level of symbolization (Barrett, 2011, 2017; Barrett & Satpute, 2013). Effectively articulating physical sensations could allow individuals to integrate bodily sensations and mental concepts, thereby associating both bottom-up moment-by-moment sensations and top-down conceptual knowledge (Shalev, 2019, 2020). This premise aligns with the neuroscientific model of levels of regulatory control that views emotion-regulation strategies as encompassing low-level unconscious automatic sensory control, as compared to higher levels of strategies involving conscious awareness (Lane, 2000).

We proposed that focusing on a pleasant or unpleasant body part as part of an interoceptive task may constitute psychosomatic congruence. Specifically, the three experiments presented here explored whether tracking and assigning semantic labels to bodily sensations in those body parts the participants considered to be momentarily the most pleasant/most unpleasant could potentiate psychosomatic congruence. In Experiment 1, the participants directed their attention towards the most pleasant or unpleasant part of their body, labelled the sensation they experienced, and then completed measures that involved generating associations for neutral words followed by affective evaluations that rated their positive and negative valence. Experiment 2 followed a similar protocol; however, the participants were asked to recall and evaluate the positive and negative valence of autobiographical memories after focusing on and labelling sensations related to their most pleasant or unpleasant body part. The third experiment added a further level of complexity by the induction of mortality salience, which was contrasted to thinking about a painful or a neutral condition. Then, participants once again focused on and labelled sensations related to their most pleasant or unpleasant body part and completed an ambiguous word task.

Experiment 1

Methods

Participants

We conducted an a-priori power analysis to estimate the sample size (using G*Power 3.1) (Faul et al., 2007). With an $\alpha = 0.05$ and a power = 0.85, the projected sample size needed to detect a medium effect size ($f =$

0.25) assuming correlations between repeated measures of $r = 0.50$ was $N = 40$ for a repeated measures within factor ANOVA. Sixty-one Caucasian undergraduates (ranging in age from 19 to 56, mean = 23.85 (1.93); 6.6 % males and 93.4 % females; all of whom identified as Jewish) volunteered to take part in the experiment. The sample was limited to native speakers of Hebrew. This was done to eliminate language problems when identifying the mental images associated with pleasant vs. unpleasant body areas. Potential participants who had been diagnosed with a clinical disorder or thought they had a clinical disorder were excluded.

Design and procedure

The experiment was presented as a study on the interplay between verbal creativity and bodily sensations. Participants provided their informed consent. They were then randomized to establish the sequence in which they would engage in the two experimental conditions and were tested individually in the laboratory. The participants were asked to focus on the most pleasant (least unpleasant) part of their body in the pleasant body part condition, and on the most unpleasant (least pleasant) part of their body in the most unpleasant body part condition. Given differences in perceptions of body image and how they are articulated (for example, Grogan, 2021), the instructions drew a parallel between 'most' pleasant and 'least' unpleasant, as well as between 'most unpleasant' and 'least pleasant'. For brevity, these alternatives are not reproduced in the text.

The participants received the following instructions: "For this task, please focus primarily on a specific bodily sensation, after which you will be asked to evoke its associations. Please take a seat, with your feet firmly on the ground and the chair supporting your back. You may choose to close your eyes. Now, meticulously scan your body." Depending on condition, the participants were guided to focus on their bodily sensations and identify: 1) the most pleasant part/the least unpleasant part of their body or 2) the most unpleasant/the least pleasant part of their body.

After the participants had identified their body part, they indicated this to the experimenter by raising their thumb. The experimenter then informed them that s/he would read out a set of words sequentially, which also appeared on a computer screen. For each word, the participants were asked to verbalize any spontaneous association that came to mind, irrespective of its perceived relevance or importance. They were reassured that logical coherence was not essential and that all responses were valid, whether specific or vague. Concurrently, the participants were asked to sustain their focus on the identified body part. Each word was presented for a duration of 60 s on the screen, with the experimenter documenting the associations stated in real time.

Depending on the pleasant/unpleasant experimental condition, the participants were exposed to one of two sets of five neutral stimulus words, read out loud by the experimenter and viewed on the computer screen. The words were derived from a detailed analysis of the Hebrew lexicon (Rubinsten et al., 2005). The selected stimulus words were nouns and were controlled for factors such as concreteness, familiarity, homophones and naming time as in Marron et al. (2020). The first set consisted of the Hebrew words for orchestra, grade, wool, restaurant, network, and train. The second set consisted of the Hebrew words for angle, gymnastics, melody, oil, audience, and carpet. The first seven associations produced within this period were documented. Then the participants were asked to evaluate the extent to which each association was positive or negative on a Likert scale ranging from 1 to 7. After a one-minute break, the participants transitioned to the second condition with the other body part and word list. Finally, the participants were debriefed, dismissed and thanked.

Analysis

Repeated measure ANOVAS were conducted for body focusing (most pleasant/ most unpleasant) X association with neutral words (Positive, Negative). All analyses were run on SPSS version 27. All the data were analyzed. There were no missing data.

Results

Manipulation check

At the end of the experiment, the participants were asked to rate the extent to which they focused on the most pleasant or unpleasant body part throughout the experiment on a scale ranging from 1 = *not at all* to 7 = *all the time*. The mean scores for all participants were 5.9 ($SD = 1.31$) for the most pleasant body part manipulation and 5.98 ($SD = 1.58$) for the most unpleasant body part manipulation.

Main analyses

To examine the main hypothesis that when participants were instructed to focus on the most pleasant/ most unpleasant part of their body they would rate the list of neutral stimulus words as more positive and less negative in comparison to when they were instructed to focus on the most unpleasant/ most pleasant part of their body, a repeated measure ANOVA for body focusing (most pleasant/ most unpleasant) X association to neutral words (Positive, Negative) was conducted.

The results supported the hypothesis and indicated a significant interaction between body focusing and affective evaluations of associations with neutral words ($F(1,60) = 86.93, p < .001, \eta^2 = 0.592$). A post-hoc analysis revealed that when participants were instructed to focus on the most pleasant part of their body, they rated their associations to the neutral words as more positive than when they focused on the most unpleasant part of their body (shown in Fig. 1).

Experiment 2

Materials and methods

Participants

We conducted an a-priori power analysis to estimate the sample size (using G*Power 3.1) (Faul et al., 2007). With an $\alpha = 0.05$ and a power = 0.85, the projected sample size needed to detect a medium effect size ($f = 0.25$) assuming correlations between repeated measures of $r = 0.50$ was $N = 40$ for a repeated measures within-factor ANOVA. Forty-three Caucasian undergraduates (ranging in age from 19 to 27, mean = 22.49 (1.86); 14.0 % males and 86.0 % females; all of whom identified as Jewish) participated in this experiment. All participants were native speakers of Hebrew. Potential participants who had been diagnosed with a clinical disorder or thought they had a clinical disorder were excluded.

Procedure

The experiment was presented as studying the interplay between

bodily sensations and memories. The participants provided their informed consent. They were then randomized to establish the sequence in which they would engage in the two experimental conditions and were tested individually in the lab. As in Experiment 1, depending on the condition assigned, participants were guided to find the most pleasant or the most unpleasant part of their body.

Again, as in Experiment 1, the participants were then asked to articulate the specific part and to name this sensation in one word. As they maintained this focus, they were prompted to recall three autobiographical memories. The participants were told that there was no right or wrong memory, that these recollections were personal, and that they would not be asked to share intimate details. Rather, they were asked to capture the essence of each memory in 2 to 3 descriptive key words which would enable them to retrieve the memory later. The participants then completed Likert scales where they rated the positivity and negativity of each memory from 1 = *not at all* to 7 = *very much*. Next, after a 60-second interval, the participants engaged in the other experimental condition.

Statistical analysis

Repeated measures ANOVAs for body focusing (most pleasant/ most unpleasant) X autobiographic memory (Positive, Negative) were conducted. All analyses were run on SPSS version 27. All the data were analyzed. There were no missing data.

Results

Manipulation check

At the end of the experiment, the participants were asked to rate the extent to which they focused on a pleasant or an unpleasant body part throughout the experiment on a scale ranging from 1 = *not at all* to 7 = *all the time*. The mean scores for all participants were 6.60 ($SD = 1.24$) for the most pleasant body part manipulation and 6.56 ($SD = 1.52$) for the most unpleasant body part manipulation.

Main analyses

To examine the main hypothesis that when participants were instructed to focus on the most pleasant of their body, they would rate their autobiographic memories as more positive than when they were instructed to focus on the most unpleasant part of their body, a repeated measure ANOVA for body focusing (most pleasant/ most unpleasant) X autobiographic memory (Positive, Negative) was conducted.

The results supported the hypothesis and indicated a significant interaction between body focusing and affective evaluations of autobiographical memories ($F(1,42) = 97.65, p < .001, \eta^2 = 0.699$). A post-

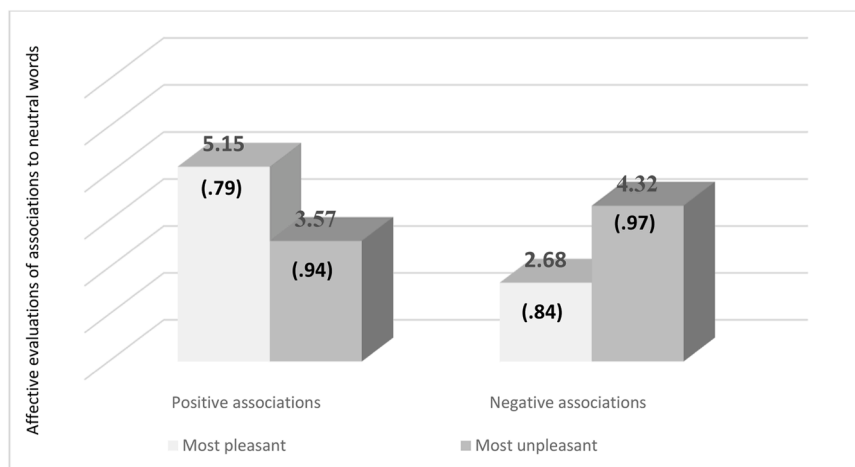


Fig. 1. Differences between focus on most pleasant and most unpleasant body part and affective evaluations of associations to neutral words
Note: Standard deviation in parentheses.

hoc analysis revealed that participants who were instructed to focus on the most pleasant part of their body rated their autobiographical memories as more positive than participants who were instructed to focus on the most unpleasant part of their body who rated their autobiographical memories as more negative (shown in Fig. 2).

Experiment 3

Materials and methods

Participants

We conducted an a-priori power analysis to estimate the sample size (using G*Power 3.1) (Faul et al., 2007). With an $\alpha = 0.05$ and a power = 0.85, the projected sample size needed to detect a medium effect size ($f = 0.25$) was approximately $N = 201$ for an ANOVA with a fixed effect, main effect and interaction. Two-hundred and fourteen Caucasian undergraduate students (ranging in age from 18 to 50, mean = 23.41 (0.15); 15.0 % males and 85.0 % females; all of whom identified as Jewish) from two universities participated in this experiment. All the participants were native speakers of Hebrew. Potential participants who had been diagnosed with a clinical disorder or thought they had a clinical disorder were excluded.

Procedure

The experiment was presented as a study on imagination and creativity. The experiment was conducted in groups. The participants were asked to come to several classrooms and sat separately. They were randomly assigned to the between-subject experimental conditions. After giving their informed consent, for training purposes, they were asked to focus on the most pleasant/unpleasant part in their body and find a word that matched this feeling as in Experiment 1.

After training, the participants were randomly divided into three conditions according to their responses to two open-ended questions used in previous studies (Greenberg et al., 1994). Participants in the mortality salience condition received the following instructions: "Please describe the emotions that the thought of your own death arouses in you" and "What do you think happens to you as you physically die and once you are physically dead?" Participants in the neutral condition were asked parallel questions, where all references to death were replaced with "watching TV." Participants in the physical pain condition were asked parallel questions, where references to death were replaced with "experiencing intense dental pain".

After completion of the task, they were prompted to focus on the

most pleasant or unpleasant part of their body and find a word that precisely described this feeling as in Experiment 1. Then, they were administered a word completion task where they were asked to rate the accessibility of negatively related thoughts. We used a measure similar to the one developed by Greenberg et al. (1994) to examine the accessibility of death-related thoughts on the Hebrew version validated by Mikulincer and Florian (2000) on an Israeli sample. The participants were asked to complete each of the 20 Hebrew word fragments with the first word that came to mind by filling in one missing letter. Eight of the 20 Hebrew fragments could spell a neutral or a negatively related Hebrew word. For example, the Hebrew fragment _TACH can be made into the Hebrew word PTACH ("open") or the negatively valenced word MTACH ("stress"). The negative Hebrew words were stress, sad, shame, sorrow, pain, failure, jealous, and anxious. The number of negatively-related Hebrew words (0–8) completed by each participant was tabulated.

Statistical analysis

The analyses involved a MANOVA for body focusing ((pleasant/unpleasant X saliency condition (Death, Pain, TV). All analyses were run on SPSS version 27. All the data were analyzed. There were no missing data.

Results

Main analyses

To examine the main hypothesis that focusing on the most pleasant part of the body would decrease the accessibility of negatively related words in all saliency conditions (death, pain, TV) in comparison to when the participants were instructed to focus on the most unpleasant part of their body, a MANOVA for body focusing ((pleasant/unpleasant X saliency condition (Death, Pain, TV) was conducted.

The results supported the hypothesis and revealed a significant effect for body focusing ($F(1208) = 9.56, p = .001, \eta^2 = 0.044$). No significant interaction between body focusing and saliency condition was found ($F(2208) = 0.032, p = .968, \eta^2 < 0.001$). Thus, the instruction to focus on most pleasant part of the body succeeded in lessening the accessibility of negatively related words to a greater extent than in participants instructed to focus on the most unpleasant part of the body regardless of the cognitive condition. A post-hoc analysis revealed that in all saliency conditions, negatively related words were less accessible when participants were instructed to focus on the most pleasant part of their body, in comparison to participants who were instructed to focus on the most unpleasant part of their body ($t_{death(76)} = -1.92, p = .029 [-1.54,$

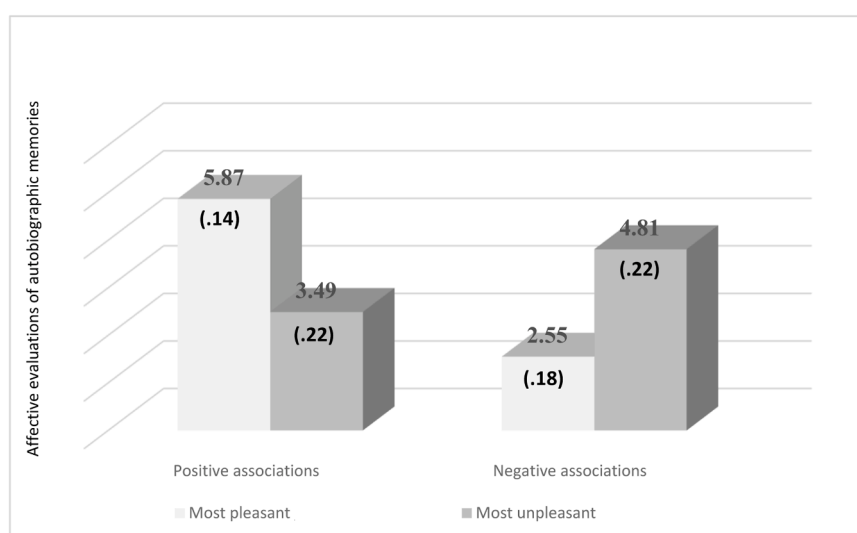


Fig. 2. Differences between evaluation of autobiographical memories and body part condition (most pleasant vs most unpleasant)
Note: Standard deviation in parentheses.

0.03]; ($t_{\text{pain}(67)} = -1.92, p = .044 [-1.34, 0.09]$; ($t_{\text{TV}(65)} = -1.74, p = .043 [-1.56, 0.11]$) (shown in Fig. 3).

General discussion

These three experiments examined the effects of initiated interoceptive focusing on the most pleasant or unpleasant part of the body, on psychosomatic congruence and the potential implications for body-oriented mentalization and emotion regulation. Based on the theory of constructed emotion (Barrett, 2017), which suggests that emotions result from integrating sensory perception and semantic categorization, and aligned with the notion of anticipatory context notions, we hypothesized that deliberately using initiated interoceptive tasks could pave the way for body-oriented mentalization and emotion regulation.

Across the three experiments, we investigated whether focusing on pleasant versus unpleasant bodily parts and labeling this experience creates psychosomatic congruence. The consistency of the findings across these experiments provides insights into this intricate nexus, which has possible implications for body-oriented mentalization and emotion regulation.

Experiment 1 provided initial evidence that bodily focus can influence the affective evaluation of free associations to neutral words. Participants focusing on the most pleasant part of their body exhibited more positive and fewer negative associations with neutral words than when they focused on the most unpleasant part of their body. This result is consistent with the embodied cognition perspective that suggests an association between bodily states and cognitive processes (Barsalou, 2008; Niedenthal, 2007) but extends this general perspective to the specific interoceptive task of focusing on bodily parts.

Experiment 2 reinforced these findings by demonstrating that participants focusing on the most pleasant body part evaluated their autobiographical memories more positively and less negatively than when they focused on the most unpleasant part of the body. This aligns with the general view of the ways in which mood influences autobiographical memory recall (Faul & LaBar, 2022).

In Experiment 3, the accessibility of negatively related words decreased under the induction of varying saliency conditions for participants who focused on the most pleasant body part as compared to focusing on their most unpleasant body part. These findings provide evidence that focusing on a bodily part may function as an emotional-regulation mechanism in a range of negative (death, pain) saliency conditions. The fact that the same effect was found in the neutral TV condition suggests that focusing on the most pleasant body part generates a positive mood.

Overall, focusing on the most pleasant bodily part and labeling it

influenced the valence of free associations, autobiographical memories, and the accessibility of negatively related words. Thus, psychosomatic congruence may serve as a potential emotion-regulation mechanism through deliberate focus on pleasant body parts. In addition, the findings suggest that psychosomatic congruence manifests in various forms of mental contents, such as associations, autobiographical memories, and the accessibility of negatively related words. Therefore, awareness of psychosomatic congruence may serve to enhance symbolization and body-oriented mentalization.

The results aligned with our initial hypothesis and are consistent with previous research that has underscored the pivotal role of bodily sensations in shaping emotional experiences (Lane, 2000; Barrett & Simmons, 2015). When attention is directed towards the most pleasant or the most unpleasant body part, it appears to exert an influence over the valence of cognitive processes. These results are in line with seminal studies by Erber and Erber (1994) and Sedikides (1994). The findings also contribute to the literature on the mood-congruence effect (Bower, 1981; Faul & LaBar, 2022) by suggesting that focusing attention on specific bodily regions can influence congruent cognition. A notable point of divergence in our work concerns the interpretation of the mood-incongruent effect. Unlike previous views that primarily regarded it as a mechanism for mood repair (Forgas & Ciarrochi, 2002), our findings offer a novel perspective that focusing on body parts can elicit sensory-congruent effects, which may have significant implications for emotion regulation. Moreover, while the mood-congruent effect pertains to the connection between emotion and cognition, our three studies encompass the aspect of physical sensation as well. Similarly, the clinical significance of psychosomatic congruence lies in our argument that awareness may aid patients experiencing somatic symptoms to better understand and mentalize their physical states.

Other interoception training methods

In addition to focusing on specific body parts, other interoception training methods have shown promise in enhancing body-oriented mentalization and emotion regulation. For instance, mindfulness-based interventions, such as Mindfulness-Based Stress Reduction (MBSR), emphasize paying non-judgmental attention to bodily sensations and have been associated with improvements in interoceptive awareness and emotional well-being (Kabat-Zinn, 1990; Farb et al., 2013; Price & Hooven, 2018). Similarly, body scan meditations, which guide individuals to systematically attend to different parts of their body, have been found to enhance the ability to detect and interpret bodily signals (Khalsa et al., 2018). Another effective approach is the use of biofeedback, where individuals receive real-time feedback on

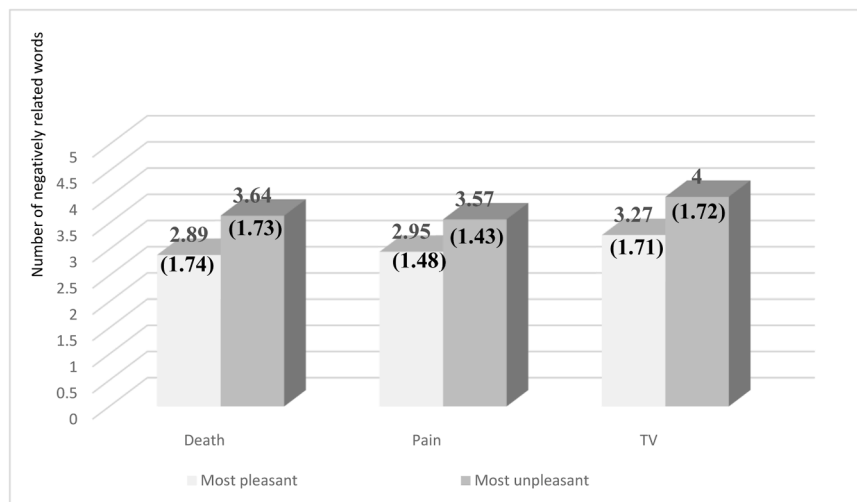


Fig. 3. Accessibility of negatively related words as a function of body focus and induction of saliency condition (death, pain, neutral). Note: Standard deviation in parentheses.

physiological processes such as heart rate and respiration, which has been shown to facilitate greater awareness and control over these bodily states (Lehrer & Gevirtz, 2014).

However, the difference between these methods and our procedure is that our studies included focusing on pleasant or unpleasant body parts and linking these sensations to semantic contents (Lieberman et al., 2007). This unique approach may foster higher levels of mentalization and create a stronger association between sensation and verbal contents. By integrating sensory focus with semantic labeling, our method may promote a deeper level of body-oriented mentalization and help encourage a more in-depth understanding and articulation of bodily experiences. This additional layer of semantic association is not typically present in other interoception training methods, thus making our approach distinct and potentially more effective in enhancing interoceptive awareness and emotion regulation.

Limitations and future directions

Although the three experiments have many strengths, there are also some limitations that deserve mention. We decided to use a subclinical population to empirically examine the principle of congruence between pleasant vs. unpleasant body area sensations and cognition. It is possible that clinical groups would react differently. However, the psychosomatic congruence principle suggested here aims to support the basic regulation of emotions by disrupting distressing high-level cognition through focusing on low-level pleasant body areas, thus resulting in positive emotions and cognitions (Barrett, 2017; Price & Hooven, 2018).

Nevertheless, certain psychopathologies could have influenced the results. To control for this bias, we used an experimental design. Even if a few students had a clinical condition, this would have been balanced out between experimental groups or simply would not have resulted in a significant effect. Nevertheless, we conducted additional analyses to determine how many participants focused on their stomach and whether significant differences would be found between experimental groups. In Experiment 3, of the 214 participants, only 21 chose their stomach as the body part to focus on. The distribution of those who chose their stomach did not significantly differ between the pleasant (9) and unpleasant (12) body areas. This range of associations in both pleasant and unpleasant body areas is indicative of psychosomatic congruence, and shows that the same area can be related to both positive and negative feelings in different people (Khalsa et al., 2018; Lehrer & Gevirtz, 2014).

Future studies should aim to understand the long-term implications of cultivating interoception and labeling in clinical populations. It would be interesting to examine whether clinical populations tend to mostly focus on unpleasant body parts. Clinical populations may find the transition between pleasant and unpleasant body parts challenging. Individuals with alexithymia may find it difficult to find the words for their feelings. Therefore, this interoceptive task can provide training for various clinical conditions and could be used as an additional tool in clinical settings for therapists (Farb et al., 2013; Lane, 2000). In summary, while our findings provide valuable insights into the role of interoception in emotion regulation, further research is needed to explore these effects in clinical populations and therapeutic settings. Understanding how different psychopathologies may influence the outcomes of interoceptive tasks and developing targeted interventions will be crucial for advancing this field.

Conclusion

These three experiments point to the role of a deliberate interoceptive task in guiding cognitive processes and facilitating body-oriented mentalization and emotion regulation. The findings suggest an intricate interplay between bodily sensations and mental contents, thus providing a novel perspective on the realms of embodied emotion regulation and psychosomatic congruence. The results have several therapeutic implications. Specifically, individuals' ability to discern and label their most pleasant body part could constitute a concrete strategy

for moment-to-moment emotion regulation, thus potentially fostering enhanced mental wellbeing and resilience in the face of emotional challenges. This could also serve to develop awareness of the connection between bodily sensation and mental contents which is at the core of body-oriented mentalization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

All data, are available at [<https://osf.io/8u2xz/>] and research materials are described in the manuscript.

Ethical statement

All procedures described in this work comply with the ethical standards of the national and institutional committees on human experimentation and with the Helsinki Declaration of 1975 as revised in 2008. All of the participants provided written informed consent, and the study protocol was reviewed and approved by the authors' Institutional Review Board (IRB) for experimental studies under the reference (AU-SOC-IS-20230130).

Preregistration

This study design and analysis were pre-registered (<https://osf.io/wrxc2/>; <https://osf.io/wgzjhj/>; <https://osf.io/w45ku/> for the three experiments).

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