

The Relationship between Interoceptive Awareness and Socio-Emotional Competence

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Abstract. Interoception is how an individual feel about their internal body, including the sensation of one's organs and emotional perception. The ability to be aware of one's internal body signals and activities is emphasized by interoceptive awareness. Socio-emotional competence is a multifaceted notion that incorporates a person's ability to accept information, to interpret it, and to respond to others during a social process. The relationship between interoceptive awareness and socioemotional competence is examined in this paper, along with the effects of interoception on socioemotional skills, including its benefits for social interaction skills, connections to socioemotional challenges, and effective interoception interventions. It also indicates that social-emotional skills may be bettered by linking interoceptive awareness to socio-emotional competence. It makes suggestions about how to take effective action to enhance interoception. Future research should work on quantifying interoceptive awareness and pay more attention to its effects on explicit sociability. It should also investigate whether social-emotional skills influence interoceptive awareness. This paper integrated the influence of internal awareness on the multifaceted aspects of socio-emotional competence. It can provide some guidance for the design of socio-emotional curriculum at schools and relevant intervention studies.

Keywords: Interoceptive awareness; Socio-emotional competence; Emotional regulation.

1. Introduction

Interoception refers to a sense of how an individual feel about their internal body, including the feeling of one's organs and the perception of one's emotions. It involves multiple processes, including psychologically and neurologically. Interoceptive awareness emphasizes being aware of one's internal body signals and activities, such as heartbeat, pain, and noticing emotional changes. Interoceptive awareness affects human emotional experiences, decision-making, and self-regulation. It is also linked with mental health problems, such as mood disorders or anxiety. In addition, interoceptive awareness is a foundation of mindfulness, which is a practice that helps people pay attention to the present moment of the environment or of their own internal bodies. Mindfulness has guided several new avenues for intervention in mental health problems or mood disorders [1].

The concept of Socio-emotional competence is a multivariate that encompasses the capability of a person to receive information, process, and react to others during a social function. Its components mainly include, for example, emotion expressivity, emotion comprehension, emotion regulation, react behaviors and problem-solving skills, and relationship skills. Socio-emotional competence is essential for oneself and how people connect with others. In past research, socio-emotional competence was more often focused on in the area of developmental psychology. Attachment theory is one of the well-known theories highlighting how socio-emotional competence is shaped by the connections made with caregivers during infancy. Attachment is the intimate connection between an infant and an adult caregiver before the age of one year. Although this theory is ethically controversial, one in which the type of attachment in infancy, i.e., secure or insecure, influences the development of socio-emotional competence is demonstrated. The security type in the attachment model refers to when the infant is anxious or needs to be cared for, and caregivers can detect the infant's situation and give care and satisfaction to the needs. Conversely, insecure relationships manifest in caregiver emotional and behavioral avoidance or conflict toward the infant or caregiver confusion about the infant's realization of being left untreated [2]. Because attachment was seen as an emotional bond, it

reflects how the infants learn emotional responses and express their emotions and further influence their emotional reactivities and regulation after infants have grown to term.

In addition to being influenced by social interactions, socio-emotional abilities are also related to the individual's own nervous system. Emotional reactivities and emotional regulation are essential processes during social interaction, their development can be observed using neurophysiological approaches. At least part of the medial and lateral prefrontal cortex in the brain has been shown to be involved in emotion regulation. Studies suggest that this functional specialization occurs earlier in infancy than once thought. This illustrates that emotion regulation abilities may form earlier, although they will still be influenced by acquired social interactions. Correspondingly, although acquired learning by social interaction plays an important role in the development of some socio-emotional capabilities, the developmental limitations imposed by innate neurological influences cannot be ignored [3].

Since interoceptive awareness and socio-emotional competence are jointly involved in individuals' attention and regulation abilities, how they affect each other has gradually been noticed by scholars. More interoceptive awareness may imply better self-regulation and perceptual skills, thus making individuals better at perceiving and reacting to others. To explore the relationship between them, this paper reviews how interoceptive influences factors of socio-emotional competence, links to socio-emotional difficulties, and effective interventions. There are also suggestions to improve socio-emotional abilities through the association between the two, using interventions of interoceptive awareness as techniques. This paper aims to investigate the effect of internal awareness on the various components of socio-emotional competence. This gives new light on how to develop socio-emotional competence.

2. The Effects of Interoceptive Awareness on Social Interaction

During social interaction, which is the interaction process between one and others, socio-emotional competencies play an essential role in it for individuals to perceive others' emotions or perspectives to respond to others. During this process, how people feel others, experience others' feelings, their attitudes toward others, and whether they can stand in others' positions might affect the behaviors and acts the people take, which directly influence the quality and efficiency of the interaction. Therefore, these factors, such as emotional perception, empathy, and perspective taking, can be seen as part of the process of social interaction. They have been investigated by the researchers in the relationships with or impacts of interoceptive awareness. A study was designed to determine how systematic manipulation of interoceptive signals affected social cognition, specifically the ability to assume another person's perspective, and how this influence was affected by empathy [4]. The empathy quotient (EQ) questionnaire was used to assess empathy before the experimental method. In this study, the own-body transformation task (OBT) is used to determine people's attitudes and competence to take others' positions; as an indicator of perspective taking, using a virtual body and asking objectives to respond to its changes count the response time.

The experiment contains two conditions: one virtual body had a blinking profile and was synchronized with the heartbeat (Heart Sync), and the other was not synchronized with the heart (Heart Async). The influences of empathy were shown. Participants with high EQ scores were more likely to be affected by the signal of cardio optic synchrony, and participants with low EQ were less likely to be affected by it. This study's findings that synchronized cardio-visual stimulation may enhance performance on a test of perspective-taking. And this impact is dependent on empathy to show the fundamental connections between interoceptive processing, perspective-taking, and empathy.

On the other hand, the perceived ability to experience others' emotions has also been influenced by one's interoception. The question of whether those with more interoceptive changes are more susceptible to learning from skewed chances of emotional displays and better at detecting others' emotions was explored. Research also looked at the connection between interoceptive sensibility and

emotion detection [5]. Prior to beginning the experiment's primary task, participants had to complete a self-report questionnaire to gauge their interoceptive sensitivity. Throughout the experiment, participants were required to perform a timed response task in which they had to select whether neutral facial expressions were dynamically changed to happy or fearful ones. During the study, skin conductance responses were also recorded. Additionally, to add a bias in favor of the emotion expressed more frequently, the probabilities of emotional expressions were changed in line with their block-wise base rates. According to the study, greater interoceptive sensitivity makes it easier to notice emotional shifts and is linked to a more accurate adjustment to emotion probability.

3. The Relationship between Interoceptive Awareness and Psychological Functioning

3.1 The Impact of Interoceptive Awareness on Emotional Regulation

Although whether the awareness of internal signals will affect people's ability to connect with the outside world has attracted more attention, an individual's ability to regulate his body may also significantly impact social processes. It has also been demonstrated to be connected to emotional control. Correlation research was created to look at the relationship between emotion regulation (i.e., recognition of emotions, management of emotions, and coping techniques) and interoception, including interoceptive accuracy and interoceptive sensitivity [6]. Ninety-five undergraduate participants completed computerized self-report questionnaires and activities involving a heartbeat perception task as part of this study. In this study, noticing capability, as a sub-scale of interoceptive sensibility, refers to the ability of people to pay attention to their emotions and feelings and was found that connect with interoceptive accuracy. Noticing can predict emotion recognition and regulation. In addition, higher noticing capacity predicts more adaptive regulatory behavior.

3.2 The Relationship between Interoceptive Awareness and Socio-Emotional Difficulties

Furthermore, rumination as a form of emotional dysregulation was also related to interoception. Rumination refers to repetitive, compulsive thinking about an event or idea. It may cause interference with normal mental function. A study investigated the influence of stress on the interoception of people with various ruminating tendencies [7]. Two experiments were conducted to study participants' subjective and objective interoception to achieve this purpose. The first was examined using an alternative to the common heartbeat detection task, while the second was assessed using self-report interoceptive processing. Participants must still report their moods and complete a planning activity as a source of stress. The findings showed that, under mild stress (not low stress), higher rumination was associated with higher heartbeat detection ability, illustrating that interoceptive awareness is positively correlated with rumination. Also, those who ruminate frequently have unstable emotions.

Furthermore, research suggests interoceptive awareness influences psychosis characteristics. It may provide evidence for the contribution of interoceptive awareness to internal control in people [8]. This study looked at interoceptive sensitivity in young individuals who potentially have symptoms of psychosis. This cross-sectional study employs snowball sampling to distribute questionnaire links over social media. Six hundred nine young individuals between the ages of 19 and 21 make up the study's sample size. Interoceptive sensitivity was evaluated and took a role in splitting samples into high-risk and low-risk groups for comparison. According to the study's findings, abnormal interoceptive sensitivity increases the likelihood of developing psychosis. Subscales of interoceptive awareness, including attention regulation, emotional awareness, and body listening, predicted an increased risk of psychosis. To reduce the prevalence of psychosis, the author suggests that intervention or interoception training may be a helpful strategy.

3.3 Relevant Interventions for Interoceptive Awareness

All the above evidence shows that interoceptive awareness is closely related to social-emotional competence, including external and internal perception and regulation, and has an impact or predictive effect. Correspondingly, this finding was expected to yield some utility. How to improve social-emotional abilities through increased awareness may be a direction for the application of these findings. Therefore, interventions regarding interoceptive awareness are worth discussing. A study was designed to examine the effects of neutrality and powerful postures on interoception and anxiety [9].

Before being randomly separated into two groups via blocking randomization, all participants' baseline mutual emotions and anxiety ratings were assessed in a lab. While the strength posture group adopted an assertive posture, the neutral posture group adopted a neutral stance. Second, the force swing group achieved a central stance twice a day, whereas the impartial stance group achieved a neutral stance twice a day over two weeks. The participants were instructed to perform the positions twice daily in the morning and evening. Participants received journal charts to aid them in following the training program. Participants' capacity to work together was evaluated after two weeks of practice and training. State anxiety decreased after one training session in both situations. However, the accuracy of common perception only improved in the force posture condition. After a two-week training period, both groups' interoceptive accuracy increased. Research suggests that implementing interventions that include adopting expanded body positions while maintaining concentration can help reduce state anxiety and improve mutual perceptual accuracy. Maintaining a neutral posture would be more advantageous for improving the accuracy or concern of mutual perception than an aggressive posture.

Another research also focuses on mindfulness-based interventions promoting adaptive regulation selection by increasing interoceptive sensitivity to emotional stimuli [10]. Eighty-four participants were divided into two groups at random: One got wait-list control while the other participated in a mindfulness-based stress reduction (MBSR) program. During the study, the experimental group needed to attend an MBSR seminar, and two groups of participants were instructed to visit the lab before and after the session. They are also required to fill out a series of online self-reported questionnaires before each session. Throughout each session, participants were connected to physiological sensors and performed two behavioral tasks: the interoception accuracy heartbeat counting test and the emotion regulation choice task. The weekly report of family practice time was also gathered for the MBSR group. Mindfulness appears to improve the responsiveness of regulatory choices to interoceptive inputs. This study shows that MBSR training can improve people's ability to choose strategies sensitive to their internal emotions. And when this sensitivity increases, there is a corresponding increase in people's subjective well-being.

4. Limitation and Future Direction

First, because interoceptive awareness has multiple dimensions and involves different domains, such as biology and psychology, the specific definition of its concept has not been integrated and unified. For example, some studies measured interoception using heartbeat identification tasks. However, others required subjects to answer questions on a self-reported form. These differences make it very likely that the different measures contributed to the various effects on the results. It is difficult to ascertain the association of interoception and socio-emotional competence with the alternative measure. Therefore, it is recommended to integrate multi-angle interoception awareness quantification modalities in future studies, to avoid errors caused by a single perspective.

Furthermore, to understand the effect of interoceptive awareness on socio-emotional competence more comprehensively, future research could focus more on external factors in social processes, e.g., how interoceptive awareness affects social skills. As more study focuses on simultaneously processing internal and external signals, there is still little interoceptive awareness of the effects on external signals communicated to each other during social processes such as emotional expression or

response behaviors. Moreover, although the correlation between interoceptive awareness and socio-emotional has been widely demonstrated and most studies support that the ability of the interoceptive awareness positively affects socio-emotional competence, whether the socio-emotional in turn affects the interoceptive awareness still needs to be discovered and investigated. It is suggested that an improvement of socio-emotional competence by intervening in the interoceptive awareness. Conversely, whether training in socio-emotional competence is effective in increasing the interoceptive awareness still awaits future discussion and study.

5. Conclusion

This paper examined the link between interoceptive awareness and socioemotional competence. It discussed how interoception influences socioemotional skills, including its impact on social interaction skills, connections to socioemotional challenges, and successful interoception interventions. Then it proposed to improve social-emotional abilities through the association of interoceptive awareness and socio-emotional competence. Finally, this paper analyzed the shortcomings of the existing studies. It was suggested that the integration of measures can effectively improve the research in interoception. It means that future studies can integrate criteria for quantifying interoceptive awareness and focus more on the effects on explicit sociability. Future research should also investigate whether social-emotional abilities affect interoceptive awareness. In this paper, the impact of interoceptive awareness on the varied facets of socio-emotional competence is compiled. This reveals new information about how to raise socioemotional competence for children and adolescents at schools.

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