



# MASTERARBEIT | MASTER'S THESIS

Titel | Title

Parental Interoceptive Sensibility and Emotion-Related  
Characteristics as Predictors of Child Socio- Emotional  
Functioning

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angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of  
Master of Science (MSc)

Wien | Vienna, 2026

Studienkennzahl lt. Studienblatt | Degree  
programme code as it appears on the  
student record sheet:

UA 066 840

Studienrichtung lt. Studienblatt | Degree  
programme as it appears on the student  
record sheet:

Masterstudium Psychologie

Betreut von | Supervisor:

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## **Abstract**

Early child socio-emotional functioning is shaped by complex interactions between caregivers' emotional and regulatory capacities. In this context, interoceptive sensibility refers to parents' subjective awareness and interpretation of internal bodily signals, alexithymia describes difficulties in identifying and describing emotions, and self-compassion reflects a supportive and non-judgmental attitude toward oneself in emotionally challenging situations. While previous research has examined these constructs separately, little is known about how they jointly relate to child outcomes. The present study investigates the multivariate associations between parental interoceptive sensibility, alexithymia, and self-compassion, and their relation to child socio-emotional functioning. Data were collected as part of the Parental Interoceptive Sensibility research project at the University of Vienna. Canonical Correlation Analysis (CCA) was applied to identify shared patterns of associations across these domains, allowing for the examination of complex, multidimensional relationships between parental characteristics. Results indicated a significant canonical correlation, reflecting a latent dimension characterized by higher interoceptive sensibility and self-compassion, and lower alexithymia. This dimension was associated with more adaptive child socio-emotional functioning, as measured by the Strengths and Difficulties Questionnaire. These findings suggest that parental emotional and bodily awareness processes are jointly relevant for understanding child socio-emotional outcomes. By adopting a multivariate perspective, this study contributes to a more integrative understanding of parental functioning. In the long term, the results may inform prevention and intervention approaches aimed at strengthening parents' emotional awareness, self-regulation, and self-compassion.

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## 1. Introduction

### 1.1 Background and Relevance

Child socio-emotional functioning is shaped by complex interactions between individual and environmental factors, with caregivers playing a central role in this process. Socio-emotional functioning refers to the ability to perceive, understand, and regulate emotions, as well as to engage in adaptive social interactions. In caregiving contexts, sensitive and responsive behavior, defined as the caregiver's ability to perceive, interpret, and appropriately respond to a child's signals, has been identified as a key determinant of children's emotional security and behavioral adjustment (Ainsworth, 2015; Bowlby, 1988). These early interactional processes provide an important foundation for later developmental outcomes and highlight the importance of understanding parental characteristics that support adaptive caregiving.

Recent research has increasingly focused on underlying parental processes that may shape caregiving behavior. In particular, emotional awareness, bodily perception, and self-regulation have been identified as central mechanisms that influence how caregivers respond to their children. Interoception, defined as the perception and interpretation of internal bodily signals (Craig, 2002), has been proposed as a key component of emotional experience and regulation. Within this framework, interoceptive sensibility refers to individuals' subjective awareness of their internal bodily states (Garfinkel et al., 2015). In addition, alexithymia, characterized by difficulties in identifying and describing emotions (Bagby et al., 1994), and self-compassion, defined as a supportive and non-judgmental attitude toward oneself in challenging situations (Neff, 2003), represent important emotion-related characteristics that may influence caregiving processes.

Although these constructs have been linked to emotional functioning, they have largely been studied in isolation. However, caregiving behavior is unlikely to be determined by single psychological characteristics alone. Instead, it may reflect the interplay of multiple processes, including bodily

awareness, emotional clarity, and self-regulation. A more integrative approach is therefore needed to understand how these characteristics jointly contribute to parental functioning and, ultimately, to child socio-emotional outcomes.

## 1.2 Research Objectives

To address this gap, the present study adopts a multivariate perspective and examines the combined role of parental interoceptive sensibility, alexithymia, and self-compassion. Specifically, the study aims to identify shared patterns of association across these constructs and to investigate how these patterns relate to child socio-emotional functioning.

Canonical Correlation Analysis (CCA) is employed as the primary analytical approach, as it allows for the simultaneous examination of relationships between two sets of variables and is particularly suited for capturing latent dimensions underlying complex, multidimensional constructs (Mihalik et al., 2022). By applying this method, the study seeks to provide a more comprehensive understanding of how multiple parental characteristics jointly contribute to child outcomes.

## 1.3 Research Questions and Hypotheses

Based on the theoretical considerations outlined above, the present study addresses the following research question:

**Can shared latent dimensions be identified that link parental interoceptive sensibility, alexithymia, and self-compassion, and how are these dimensions associated with child socio-emotional functioning?**

To further specify this question, two research aims are distinguished. First, the study examines whether shared multivariate associations emerge between parental interoceptive sensibility and

emotion-related characteristics. Second, it investigates whether these associations are related to child socio-emotional functioning.

Accordingly, the following hypotheses are proposed:

**Hypothesis 1.** At least one significant canonical correlation will emerge linking parental interoceptive sensibility and emotion-related characteristics, indicating a shared latent dimension of parental functioning.

**Hypothesis 2.** Higher interoceptive sensibility, lower alexithymia, and higher self-compassion will be associated with more adaptive child socio-emotional functioning.

## 2. Theoretical Background

### 2.1 Child Socio-Emotional Functioning

Child socio-emotional functioning refers to the ability to experience, understand, and regulate emotions, as well as to engage in adaptive social interactions with others. It encompasses a range of competencies, including emotional awareness, behavioral regulation, empathy, and the ability to form and maintain relationships. These capacities are central to children's overall development and have been linked to a wide array of outcomes, including mental health, academic achievement, and social adjustment (Denham et al., 2003; Eisenberg et al., 2010).

The development of socio-emotional functioning is shaped by ongoing interactions between the child and their environment, with caregivers playing a particularly influential role. According to attachment theory, early relationships provide the foundation for emotional security and regulation (Bowlby, 1988). Caregivers who respond sensitively to children's signals, by accurately perceiving, interpreting, and responding to their needs, support the development of secure attachment relationships, which in turn promote adaptive socio-emotional functioning (Ainsworth, 2015). In

contrast, inconsistent or insensitive caregiving may hinder the development of emotional regulation and increase the risk for behavioral and emotional difficulties.

Beyond observable caregiving behaviors, parental characteristics that influence how caregivers perceive and respond to emotional cues are increasingly recognized as important determinants of child outcomes. In particular, caregivers' own emotional awareness, regulatory capacities, and stress responses may shape the quality of parent–child interactions. These internal processes can affect not only how parents interpret their children's behavior, but also how they regulate their own emotional reactions in challenging situations.

In empirical research, child socio-emotional functioning is often operationalized using standardized parent-report measures, such as the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001). The SDQ assesses multiple domains, including emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior. While such measures provide a comprehensive overview of children's functioning, it is important to note that they rely on caregivers' perceptions, which may be influenced by parental characteristics. This highlights the relevance of examining parental processes not only as predictors of child outcomes, but also as factors that may shape how these outcomes are reported.

Taken together, these findings underscore the importance of understanding parental influences on child socio-emotional functioning. While traditional research has emphasized observable caregiving behaviors, a growing body of literature suggests that underlying parental processes, such as emotional awareness, bodily perception, and self-regulation, may play a critical role in shaping both parenting behavior and child development. The following sections therefore focus on key parental characteristics that may contribute to these processes.

## **2.2 Interoceptive Sensibility**

### **2.2.1 Conceptual Foundations**

Interoceptive sensibility refers to the perception, interpretation, and integration of signals originating from within the body, including cardiac, respiratory, and visceral sensations (Craig, 2002). These signals provide continuous information about the physiological condition of the organism and are increasingly understood as a fundamental component of emotional experience and self-regulation. Rather than being a purely physiological process, interoceptive sensibility is now conceptualized as an integrative system that links bodily states with cognitive and affective processes.

Contemporary theoretical frameworks emphasize that emotions are closely tied to bodily signals. According to embodied and predictive processing accounts, the brain continuously generates predictions about internal bodily states and updates these predictions based on incoming sensory information (Fotopoulou & Tsakiris, 2017). Within this framework, interoceptive sensibility plays a key role in shaping subjective feeling states by integrating bottom-up bodily signals with top-down expectations. As a result, individual differences in interoceptive processing may influence how emotions are experienced, interpreted, and regulated.

Importantly, interoceptive sensibility is not a unitary construct but comprises multiple components that capture different aspects of bodily awareness. A widely used model distinguishes between interoceptive accuracy, interoceptive sensibility, and interoceptive awareness (Garfinkel et al., 2015). Interoceptive accuracy refers to the objective ability to detect internal bodily signals, typically assessed using performance-based tasks such as heartbeat detection paradigms. In contrast, interoceptive sensibility reflects individuals' subjective perception of their bodily awareness, usually measured through self-report questionnaires. Interoceptive awareness describes the metacognitive correspondence between objective accuracy and subjective confidence in one's interoceptive abilities.

These distinctions are crucial, as empirical evidence suggests that the different components of interoceptive sensibility are only weakly to moderately correlated and may rely on partially distinct mechanisms (Garfinkel et al., 2015). For example, individuals may report high awareness of their bodily states despite showing low objective accuracy, or vice versa. This dissociation highlights the importance of clearly specifying which aspect of interoceptive sensibility is being examined in a given study.

In the present study, interoception is conceptualized as interoceptive sensibility, reflecting individuals' subjective awareness of and attention to internal bodily states. This focus is guided by both theoretical and methodological considerations. From a theoretical perspective, subjective bodily awareness is particularly relevant for understanding emotional experience and regulation in everyday contexts. From a methodological perspective, the constructs assessed in this study are measured via self-report instruments, which capture perceived rather than objectively measured interoceptive abilities. Accordingly, the term interoceptive sensibility is used throughout this thesis to refer to subjective awareness and perception of internal bodily states unless otherwise specified.

### ***2.2.2 Interoceptive Sensibility and Emotional Functioning***

Within the context of parenting, interoceptive sensibility may influence caregiving behavior by shaping how caregivers perceive and respond to both their own internal states and their children's emotional signals. Parenting often involves managing emotionally demanding situations, such as responding to child distress, regulating frustration, or maintaining patience under stress. In such contexts, the ability to detect and interpret internal bodily cues may play a critical role in guiding behavior.

Caregivers with higher interoceptive sensibility may be better able to recognize physiological signs of stress or emotional arousal in themselves, allowing them to regulate their responses more effectively. This may contribute to more stable and responsive caregiving behavior, as parents are able

to adjust their reactions in a flexible and context-appropriate manner. In addition, awareness of internal states may facilitate greater sensitivity to children's needs by enhancing caregivers' attunement to emotional and physiological cues (Rutherford et al., 2015).

In contrast, lower interoceptive sensibility may limit caregivers' awareness of their own internal states, potentially leading to less regulated emotional responses. For example, parents who are less aware of rising stress levels may be more likely to react impulsively or inconsistently in challenging situations. This may, in turn, affect the quality of parent–child interactions and influence children's socio-emotional development (Dix, 1991; Rutherford et al., 2015).

Empirical research on interoceptive sensibility in parenting is still emerging but provides initial support for these assumptions. For instance, studies have reported associations between parental interoceptive processes and infants' interoceptive sensitivity, suggesting that bodily awareness may be relevant in early developmental contexts (Imafuku et al., 2023; Tünte et al., 2025). These findings point to the possibility that interoceptive processes may play a role in shaping parent–child interactions, although the underlying mechanisms remain to be fully understood.

Importantly, interoceptive sensibility is unlikely to act in isolation. Its influence on parenting may depend on how bodily signals are interpreted and regulated, which in turn is shaped by other psychological characteristics. In particular, the ability to identify and describe emotions, as well as the tendency to respond to oneself with compassion, may moderate how interoceptive information is processed and used in caregiving contexts. This highlights the importance of examining interoceptive sensibility within a broader framework of emotion-related processes, as will be discussed in the following sections.

### ***2.2.3 Interoceptive Sensibility in Parenting Contexts***

Interoceptive sensibility has been increasingly linked to emotional functioning, as bodily signals are thought to form a core component of emotional experience. According to theoretical models of emotion, physiological changes, such as alterations in heart rate or respiration, contribute to the subjective experience of emotions by providing internal feedback that is interpreted by the individual (Craig, 2002; Damasio, 1996). In this sense, interoceptive sensibility can be understood as a bridge between physiological processes and psychological experience.

Individuals with higher interoceptive sensibility may be more attuned to subtle changes in their internal states, which can facilitate more nuanced emotional awareness (Herbert & Pollatos, 2012). This heightened awareness may support adaptive emotion regulation by allowing individuals to detect early signs of emotional arousal and to respond accordingly. For example, recognizing bodily cues associated with stress may enable individuals to engage in regulatory strategies before emotional responses escalate (Füstös et al., 2013).

Conversely, reduced interoceptive sensibility may be associated with difficulties in identifying and differentiating emotional states. This may lead to less effective emotion regulation, as individuals may struggle to accurately interpret internal cues or to anticipate emotional responses. Such difficulties have been linked to various forms of psychological distress, highlighting the broader relevance of interoceptive sensibility for mental health (Brewer et al., 2016; Murphy et al., 2018).

Importantly, the relationship between interoceptive sensibility and emotional functioning is not necessarily linear. While greater awareness of bodily states can be beneficial, excessively heightened attention to internal signals may also be associated with maladaptive processes, such as increased anxiety or hypervigilance (Domschke et al., 2010). This suggests that the adaptive value of interoceptive sensibility may depend on its interaction with other psychological processes, including cognitive appraisal and emotion regulation strategies.

## **2.3 Alexithymia**

### ***2.3.1 Conceptual Foundations***

Alexithymia is a multidimensional construct that describes difficulties in identifying, differentiating, and describing one's own emotional states. The term was originally introduced to characterize individuals who show limited emotional awareness and a tendency toward externally oriented thinking, focusing more on external events than on internal experiences (Sifneos, 2010). Contemporary conceptualizations define alexithymia as comprising three core components: (1) difficulties identifying feelings, (2) difficulties describing feelings, and (3) an externally oriented cognitive style (Bagby et al., 1994; Taylor et al., 1999).

From a theoretical perspective, alexithymia reflects impairments in the cognitive processing of emotional information. Individuals high in alexithymia often struggle to differentiate between emotional states and bodily sensations, which may lead to a reduced ability to interpret internal experiences accurately. This has been linked to deficits in emotional awareness, as emotions may remain undifferentiated or poorly conceptualized.

Importantly, alexithymia is not considered a clinical disorder in itself but rather a dimensional personality construct that varies across individuals (Taylor et al., 1999). Higher levels of alexithymia have been associated with difficulties in emotion regulation, interpersonal functioning, and increased vulnerability to psychological distress and psychopathology (Bagby et al., 1994; Lumley et al., 2007; Taylor et al., 1999). Research has additionally linked alexithymia to broader personality dimensions, particularly higher neuroticism and lower openness to experience within the Five-Factor Model of personality, suggesting that alexithymia may reflect stable individual differences in emotional processing and self-awareness (Luminet et al., 1999). These associations highlight the broader relevance of alexithymia as a construct capturing variability in emotional awareness and emotional functioning across individuals.

Conceptually, alexithymia can be positioned within broader models of emotional functioning as reflecting a disruption at the level of emotional awareness and interpretation. While interoceptive sensibility provides access to internal signals, alexithymia reflects the ability to cognitively process and label these signals as emotions. This distinction suggests that individuals may perceive internal states without being able to meaningfully interpret them, underscoring the importance of considering both constructs jointly.

### ***2.3.2 Alexithymia and Emotional Functioning***

A substantial body of research has linked alexithymia to impairments in emotional functioning. Individuals high in alexithymia tend to show reduced emotional awareness, difficulties in differentiating between emotional states, and limited ability to use emotional information for guiding behavior (Taylor et al., 1999). These difficulties can have downstream effects on emotion regulation, as effective regulation depends on the ability to accurately identify and understand one's emotional experiences.

From an emotion regulation perspective, alexithymia has been associated with less adaptive regulatory strategies and increased reliance on maladaptive coping mechanisms. For example, individuals high in alexithymia may struggle to recognize early signs of emotional arousal, making it more difficult to engage in timely and effective regulation. This may result in either under-regulation, such as emotional suppression, or over-regulation, such as heightened physiological reactivity without clear emotional awareness.

Furthermore, alexithymia has been linked to reduced empathy and difficulties in social cognition, suggesting that impairments in emotional awareness extend beyond the self to the perception of others (Bird & Viding, 2014; Grynberg et al., 2010). This is particularly relevant in interpersonal contexts, where the ability to understand and respond to others' emotions plays a central role in social functioning.

It is important to note that alexithymia does not necessarily imply a complete absence of emotional experience. Rather, it reflects a reduced capacity to consciously access and articulate emotional states (Lane et al., 1997; Taylor et al., 1999). As a result, individuals high in alexithymia may still experience emotional arousal but lack the cognitive framework to interpret and communicate these experiences effectively.

### ***2.3.3 Alexithymia in Parenting Contexts***

In the context of parenting, alexithymia may have important implications for caregiving behavior and parent–child interactions. Parenting requires the ability to perceive, interpret, and respond to both one’s own emotional states and those of the child. Difficulties in identifying and understanding emotions may therefore limit caregivers’ capacity to respond sensitively to children’s needs. Consistent with this assumption, emotional awareness has been identified as a key component of sensitive caregiving and effective parent–child interactions (Ainsworth, 2015; Dix, 1991).

Caregivers high in alexithymia may struggle to accurately interpret their children’s emotional signals, particularly in situations involving distress or ambiguous cues. This may lead to less consistent or less appropriate responses, potentially affecting the quality of parent–child interactions. For example, a caregiver who has difficulty identifying their own emotional reactions may be less able to regulate stress or frustration in challenging situations, which could result in less adaptive responses to child behavior (Dix, 1991; Rutherford et al., 2015).

In addition, alexithymia may influence how caregivers perceive and report their children’s behavior. Given that many measures of child socio-emotional functioning rely on parent reports, individual differences in emotional awareness may shape how children’s behaviors are interpreted and evaluated. Parents with higher levels of alexithymia may be less accurate in recognizing or labeling

children's emotional and behavioral difficulties, which introduces the possibility of reporting biases in assessments of child functioning (De Los Reyes & Kazdin, 2005; Rutherford et al., 2015).

Empirical research supports the relevance of alexithymia in parenting contexts. Higher levels of parental alexithymia have been associated with reduced emotional attunement, lower parental sensitivity, and greater difficulties in parent–child relationships (Lumley et al., 2007; Rutherford et al., 2015). These findings suggest that alexithymia may represent a risk factor for maladaptive caregiving processes, particularly in emotionally demanding situations where effective emotion recognition and regulation are required.

At the same time, alexithymia is unlikely to act in isolation. Its effects on parenting may depend on its interaction with other processes, such as bodily awareness and emotion regulation. For instance, limited emotional awareness may be particularly problematic when combined with reduced interoceptive sensibility or low self-compassion, as these combinations may further constrain caregivers' ability to process and regulate emotional experiences. This highlights the importance of examining alexithymia within a broader, integrative framework of parental functioning.

## **2.4 Self-Compassion**

### ***2.4.1 Conceptual Foundations***

Self-compassion is a construct that describes how individuals relate to themselves in moments of difficulty, failure, or emotional distress. It is defined as a supportive, understanding, and non-judgmental attitude toward oneself and has been conceptualized as comprising three core components: self-kindness, common humanity, and mindfulness (Neff, 2003). Self-kindness refers to treating oneself with care and understanding rather than harsh self-criticism. Common humanity involves recognizing that suffering and imperfection are part of the shared human experience. Mindfulness refers to maintaining a balanced awareness of one's emotions without over-identifying with them.

From a theoretical perspective, self-compassion is closely linked to emotional processing and regulation. It represents not only an affective stance toward oneself but also a regulatory mechanism that influences how individuals respond to emotional challenges. Individuals high in self-compassion tend to approach negative experiences with acceptance and understanding, whereas those low in self-compassion are more likely to engage in self-criticism, rumination, or avoidance (Neff, 2003; Neff & Germer, 2013).

Importantly, self-compassion differs from related constructs such as self-esteem. While self-esteem is often based on evaluations of self-worth, self-compassion is not contingent on success or comparison with others. Instead, it provides a stable source of emotional support that is available even in the face of failure or distress. This distinction is particularly relevant in emotionally demanding contexts, where reliance on self-evaluative processes may be less adaptive.

#### ***2.4.2 Self-Compassion and Emotion Regulation***

A growing body of research has demonstrated that self-compassion is strongly associated with adaptive emotion regulation. Individuals with higher levels of self-compassion tend to show greater emotional resilience, lower levels of stress and anxiety, and more effective coping strategies (MacBeth & Gumley, 2012; & Dahm, 2015a). From an emotion regulation perspective, self-compassion can be understood as facilitating a more balanced and flexible response to emotional experiences.

One mechanism through which self-compassion may influence emotion regulation is by reducing maladaptive strategies such as rumination and suppression. Self-compassionate individuals are more likely to acknowledge negative emotions without becoming overwhelmed by them, allowing for more effective processing and integration of emotional experiences. This aligns with broader models of emotion regulation, which emphasize the importance of awareness and acceptance in adaptive functioning (Gross, 1998; Neff & Dahm, 2015b).

In addition, self-compassion has been linked to physiological regulation processes, including reduced stress reactivity and more adaptive autonomic responses. These findings suggest that self-compassion not only affects subjective emotional experience but may also influence underlying biological systems associated with stress and regulation.

Importantly, self-compassion may interact with other aspects of emotional processing. For example, the benefits of accurately perceiving and identifying emotional states may depend on how individuals respond to these states. High interoceptive sensibility or emotional awareness may not lead to adaptive outcomes if individuals respond with self-criticism or avoidance. In this sense, self-compassion can be understood as a moderating or complementary process that shapes the impact of emotional awareness on regulation.

#### ***2.4.3 Self-Compassion in Parenting Contexts***

In parenting contexts, self-compassion may play a critical role in shaping how caregivers respond to the emotional demands of caregiving. Parenting often involves situations characterized by stress, uncertainty, and emotional intensity, requiring caregivers to regulate their own emotions while simultaneously responding to their child's needs. In such contexts, the ability to respond to oneself with understanding and acceptance may support more adaptive caregiving behavior.

Caregivers high in self-compassion may be better able to cope with parenting-related stress and challenges. By responding to their own difficulties with kindness rather than self-criticism, they may maintain greater emotional stability and reduce the likelihood of reactive or inconsistent behavior. This may, in turn, facilitate more sensitive and responsive interactions with their children. Self-compassion has also been linked to greater psychological well-being, which may further support positive parenting practices (Moreira et al., 2015; Neff & Faso, 2015).

In addition, self-compassion may influence how caregivers interpret and respond to their children's behavior. A self-compassionate stance may promote greater patience and understanding, particularly in challenging situations such as child distress or behavioral difficulties. Rather than reacting with frustration or self-blame, caregivers may be more likely to adopt a reflective and supportive approach.

Empirical studies have begun to examine the role of self-compassion in parenting and have found that higher levels of self-compassion are associated with more adaptive parenting practices, including greater emotional availability, lower parenting stress, and more positive parent-child relationships (Moreira et al., 2015; Neff & Faso, 2015). These findings suggest that self-compassion may serve as a protective factor in parenting contexts, supporting both caregiver well-being and child development.

At the same time, self-compassion is likely to interact with other parental characteristics. For example, the ability to respond compassionately to oneself may depend on the accurate perception and interpretation of emotional states. Without sufficient emotional awareness or clarity, individuals may struggle to apply self-compassion effectively. This highlights the importance of considering self-compassion within a broader framework of emotional and bodily processes, as explored in the present study.

## **2.5 Integrative Perspective on Parental Functioning**

The constructs of interoceptive sensibility, alexithymia, and self-compassion have each been linked to emotional functioning and psychological well-being. However, they are rarely examined within a unified framework. From an integrative perspective, these constructs can be understood as complementary components of a broader system of socio-emotional functioning in parents. Examining

how these processes interact is essential for capturing the complexity of caregiving behavior in real-world contexts.

At a conceptual level, interoceptive sensibility, alexithymia, and self-compassion may reflect different stages of emotional processing. Interoceptive sensibility provides access to internal bodily signals that form the basis of emotional experience (Craig, 2002; Fotopoulou & Tsakiris, 2017).

Alexithymia reflects the ability to identify and cognitively represent these emotional states, with higher levels indicating impairments in emotional awareness and differentiation (Bagby et al., 1994; Taylor et al., 1999). Self-compassion, in turn, represents a regulatory stance toward emotional experiences, shaping how individuals respond to distress and negative affect (Neff, 2003). Together, these processes span a continuum from the perception of internal signals to their interpretation and regulation.

This perspective aligns with broader models of emotion regulation, which emphasize that adaptive functioning depends on multiple interacting processes, including emotional awareness, cognitive appraisal, and regulatory strategies (Gross, 1998). From this viewpoint, effective functioning requires not only access to internal signals but also the ability to interpret and regulate them in a flexible and adaptive manner. Deficits or strengths in any of these components may therefore influence how individuals respond to emotional challenges.

In the context of parenting, these processes are particularly relevant. Caregivers are required to continuously monitor, interpret, and regulate both their own emotional states and those of their children. Parenting often involves emotionally demanding situations, such as responding to child distress or managing conflict, which require flexible and adaptive responses. The ability to perceive internal signals, accurately interpret emotional experiences, and regulate responses in a supportive manner may therefore represent a central dimension of parental functioning (Dix, 1991; Rutherford et al., 2015).

Importantly, traditional research has largely examined interoceptive sensibility, alexithymia, and self-compassion in isolation, typically using univariate or bivariate approaches. While these approaches

provide valuable insights, they may not adequately capture the complexity of psychological functioning. Human behavior, particularly in caregiving contexts, is unlikely to be determined by single variables. Instead, it emerges from the interaction of multiple processes that jointly shape perception, interpretation, and regulation of emotional experiences.

A multivariate perspective offers a more comprehensive approach to addressing this limitation. By simultaneously considering multiple constructs, it becomes possible to identify shared patterns of variation that reflect underlying dimensions of functioning. Canonical Correlation Analysis (CCA) is particularly suited for this purpose, as it allows for the examination of relationships between two sets of variables and the identification of latent dimensions that capture their shared variance (Mihalik et al., 2022). Rather than focusing on isolated associations, CCA enables the investigation of how combinations of parental characteristics relate to child outcomes.

Importantly, this approach conceptualizes parental functioning along continuous dimensions rather than discrete categories. In contrast to profile-based approaches, which assume distinct groups of individuals, CCA identifies latent dimensions that reflect continuous variation in underlying processes. These dimensions can be interpreted as representing varying levels of adaptive or maladaptive functioning. For example, a dimension characterized by higher interoceptive sensibility, lower alexithymia, and higher self-compassion may reflect a more adaptive pattern of functioning, whereas the opposite pattern may indicate increased vulnerability.

This integrative framework also connects to transdiagnostic perspectives in psychology, which emphasize common underlying processes across different domains of functioning. Constructs such as emotional awareness, regulation, and self-related processing have been identified as central mechanisms in a wide range of psychological outcomes (Aldao et al., 2010; Harvey & Delfabbro, 2004). By examining interoceptive sensibility, alexithymia, and self-compassion together, the present study

contributes to this perspective by investigating whether these processes jointly form a meaningful dimension of parental functioning that is relevant for child socio-emotional outcomes.

Taken together, this integrative perspective provides the theoretical foundation for the present study. By conceptualizing parental interoceptive sensibility, alexithymia, and self-compassion as interconnected components of socio-emotional functioning, the study moves beyond isolated associations and toward a more holistic understanding of caregiving processes. This framework directly informs the choice of a multivariate analytical approach and guides the investigation of how shared patterns of parental characteristics relate to child socio-emotional functioning.

## **2.6 Empirical Integration and Research Gap**

A growing body of research has demonstrated that parental emotional and regulatory processes play a central role in shaping child socio-emotional functioning. Individual constructs such as interoceptive sensibility, alexithymia, and self-compassion have each been linked to emotional awareness, regulation, and interpersonal functioning, all of which are critical for effective caregiving. For instance, interoceptive processes have been associated with emotional awareness and sensitivity to internal states (Craig, 2002; Fotopoulou & Tsakiris, 2017), alexithymia has been linked to impairments in emotional identification and expression (Bagby et al., 1994; Taylor et al., 1999), and self-compassion has been shown to support adaptive emotion regulation and psychological well-being (MacBeth & Gumley, 2012; Neff, 2003). In parenting contexts, these processes have further been associated with caregiving quality, parental sensitivity, and stress regulation (Dix, 1991; Moreira et al., 2015; Rutherford et al., 2015).

Despite these advances, existing research has largely examined these constructs in isolation. Most studies adopt univariate or bivariate approaches, focusing on the relationship between a single parental characteristic and child outcomes. While such approaches provide valuable insights, they may

not adequately capture the complexity of caregiving processes, which are inherently multidimensional. Emotional functioning in parents is unlikely to be determined by a single factor but rather emerges from the interaction of multiple processes, including bodily awareness, emotional understanding, and self-regulation.

This limitation is particularly relevant in the context of parenting, where caregivers are required to simultaneously monitor internal states, interpret emotional experiences, and regulate their responses in dynamic and often stressful situations. Examining individual constructs separately may therefore obscure meaningful patterns that arise from their combined influence. For example, the ability to perceive bodily signals may only be beneficial when accompanied by sufficient emotional awareness and adaptive regulatory strategies. Conversely, deficits in one domain may be compensated or exacerbated by strengths or weaknesses in another.

Furthermore, empirical research directly linking these combined parental processes to child socio-emotional functioning remains limited. While there is evidence that individual factors such as parental emotion regulation or stress are associated with child outcomes, few studies have examined how multiple emotion-related characteristics jointly relate to children's development. This represents a significant gap in the literature, as it limits our understanding of how complex parental functioning translates into developmental outcomes in children.

To address these limitations, a more integrative and multivariate approach is needed. Rather than focusing on isolated associations, such an approach allows for the identification of shared patterns across multiple constructs. Canonical Correlation Analysis (CCA) provides a suitable method for this purpose, as it enables the simultaneous examination of relationships between two sets of variables and the extraction of latent dimensions that capture their shared variance (Mihalik et al., 2022). This approach makes it possible to investigate how combinations of parental characteristics relate to child

socio-emotional functioning, thereby offering a more comprehensive understanding of caregiving processes.

Importantly, this perspective shifts the focus from single predictors to underlying dimensions of functioning. Instead of assuming discrete categories or profiles, parental functioning is conceptualized as varying along continuous dimensions that reflect the interaction of multiple processes. This aligns with contemporary perspectives in psychology that emphasize dimensional and transdiagnostic approaches to understanding behavior (Aldao et al., 2010; Harvey & Delfabbro, 2004).

Against this background, the present study aims to integrate interoceptive sensibility, alexithymia, and self-compassion within a unified framework and to examine their joint association with child socio-emotional functioning. By adopting a multivariate approach, the study seeks to extend existing research and provide a more nuanced understanding of how parental emotional processes are linked to child developmental outcomes.

### **3. Method**

#### **3.1 Study Design and Context**

The present study was conducted within the framework of the *Parental Interoception* research project, an ongoing research initiative investigating the role of parental bodily awareness and emotional processes in early parent–child interactions and child development. The project combines questionnaire-based assessments with behavioral and physiological measures to capture multiple dimensions of parental and child functioning.

The current study employs a cross-sectional, correlational design based on questionnaire data collected from primary caregivers. The primary aim is to examine the associations between parental interoceptive sensibility, alexithymia, and self-compassion, and their relation to child socio-emotional

functioning. As such, the study does not involve experimental manipulation but focuses on naturally occurring individual differences in these constructs.

In addition to questionnaire measures, the broader research project includes video-based assessments of interoceptive accuracy (e.g., iBEAT and iBREATH tasks). However, these data are currently undergoing validation and were therefore not included in the present analyses. Consequently, the study focuses exclusively on self-report measures of parental characteristics and child outcomes.

To address the research questions, a multivariate analytical approach was adopted. Canonical Correlation Analysis (CCA) was used to examine the relationships between two sets of variables: (1) parental interoceptive sensibility and emotion-related characteristics, and (2) child socio-emotional functioning. This approach allows for the identification of latent dimensions that capture shared variance across multiple constructs, providing a more comprehensive understanding of the associations between parental processes and child outcomes.

Overall, the study is designed to provide an integrative perspective on parental functioning by examining how multiple emotion-related characteristics jointly relate to child socio-emotional development within a naturalistic, non-experimental context.

### **3.2 Participants and Recruitment**

The present study was conducted within the framework of the Parental Interoception (PIQ) research project. Caregivers were recruited via an existing online participant database containing contact information of families who had previously agreed to be contacted for research participation. Eligible parents were contacted by email and invited to take part in the study. Data collection for this thesis took place online between July 2025 and February 2026.

The final sample consisted of **N = 186 primary caregivers** who provided complete data on the variables included in the analyses. Participants were included if they provided complete data on all

variables relevant to the main analyses. Cases with missing data on any of the variables included in the Canonical Correlation Analysis were excluded using listwise deletion.

Information on child age was not available for the current dataset, as the relevant data could not be reliably matched to the questionnaire responses at the time of analysis. While this limits the ability to characterize the sample in terms of developmental stage, the study focuses on general child socio-emotional functioning as reported by caregivers.

### **3.3 Measures**

#### **3.3.1 Parental Interoceptive Sensibility**

Parental interoceptive sensibility was assessed using multiple self-report instruments capturing subjective awareness, attention to, and evaluation of internal bodily states. In the present study, interoceptive sensibility refers to individuals' perceived ability to notice, interpret, and utilize internal bodily signals.

The primary measure was the *Parental Interoception Questionnaire*, which assesses several dimensions of parental interoceptive sensibility in caregiving contexts. Subscales included attention to bodily signals, epistemic attitudes toward internal states, perceived self-efficacy in interpreting bodily signals, regulatory use of bodily information, and the perceived linkage between bodily and emotional processes. In addition to subscale scores, a total score was computed to represent overall parental interoceptive sensibility.

To complement the PIQ, two additional self-report measures were included: the *Interoceptive Attention Scale (IAS)* (Murphy et al., 2020) and the *Interoceptive Accuracy Scale (IAS)* (Murphy et al., 2018). Despite their naming, both instruments assess subjective perceptions of interoceptive abilities rather than objective performance. Together, these measures provide a multidimensional assessment of

parental interoceptive sensibility, capturing attentional, cognitive, and evaluative aspects of bodily awareness.

### **3.3.2 Alexithymia**

Parental alexithymia was measured using the *Perth Alexithymia Questionnaire* (PAQ) (Preece et al., 2023). The PAQ is a self-report instrument designed to assess difficulties in identifying and describing emotional states, as well as externally oriented thinking.

In the present study, a total score was used to represent overall levels of alexithymia. Higher scores indicate greater difficulties in emotional awareness and expression.

### **3.3.3 Parental Self-Compassion**

Parental self-compassion was assessed using the *Self-Compassion Scale* (SCS) (Neff, 2003). The scale measures how individuals relate to themselves in situations of difficulty and includes both adaptive and maladaptive components.

Subscales included self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. In addition to subscale scores, a total self-compassion score was calculated, with higher scores indicating greater self-compassion.

### **3.3.4 Child Socio-Emotional Functioning**

Child socio-emotional functioning was assessed using the *Strengths and Difficulties Questionnaire* (SDQ) (Goodman, 2001), a widely used parent-report measure of children's behavioral and emotional adjustment.

The SDQ comprises five subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior. In the present study, both

subscale scores and a total difficulties score were used. The total difficulties score reflects overall levels of socio-emotional and behavioral problems, with higher scores indicating greater difficulties.

### ***3.3.5 Additional Measures***

Within the broader PIQ research project, additional behavioral measures of interoceptive accuracy (iBEAT and iBREATH) were collected. However, these data are currently undergoing validation, and the available sample size is presently too small for meaningful statistical analysis. Consequently, these measures were not included in the present analyses.

## **3.4 Procedure and Data Management**

After providing informed consent, participants completed the study questionnaires online. The assessment included measures of parental interoceptive sensibility, alexithymia, self-compassion, and child socio-emotional functioning.

Data preprocessing and statistical analyses were conducted in R (version 2025.09.2+418). Variables were recoded and scored according to questionnaire guidelines, including the transformation of reverse-coded items and the calculation of subscale and total scores. Cases with missing data on variables included in the main analyses were excluded using listwise deletion.

## **3.5 Statistical Analysis**

### ***3.5.1 Assumption Checks***

Prior to the main analyses, descriptive statistics and distributional properties of all variables were examined. Skewness estimates were inspected to evaluate deviations from normality. Pairwise relationships between variables were additionally assessed using scatterplots and correlation matrices.

To evaluate the suitability of the data for multivariate analyses, several assumption checks were conducted. Multicollinearity between variables was examined using correlation matrices, with correlations above .80 considered indicative of potentially problematic overlap between variables. Bartlett's tests of sphericity were performed to assess whether the correlation structures were appropriate for multivariate analysis. In addition, Kaiser–Meyer–Olkin (KMO) measures of sampling adequacy were calculated to evaluate whether sufficient shared variance existed among variables to justify the extraction of latent dimensions. KMO values above .60 were considered acceptable.

### ***3.5.2 Canonical Correlation Analysis***

The primary analyses were conducted using Canonical Correlation Analysis (CCA). CCA is a multivariate statistical technique that examines relationships between two sets of variables by identifying latent dimensions that maximize the shared variance between the sets. In the present study, the first variable set consisted of parental interoceptive sensibility measures, while the second variable set included measures of alexithymia and self-compassion.

Canonical roots were extracted and interpreted based on their canonical correlations, statistical significance, and loading patterns. Canonical loadings were examined to determine the contribution of individual variables to each latent dimension. Significance testing of canonical correlations was conducted using Wilks' lambda.

To further investigate the identified latent dimensions, individual canonical scores were extracted for each participant based on the first canonical root. A combined shared score was subsequently computed by averaging the standardized canonical scores of both variable sets. For interpretational clarity and consistency with the study hypotheses, this score was inverted so that higher values reflected a more adaptive pattern characterized by higher parental interoceptive sensibility, lower alexithymia, and higher self-compassion.

### **3.5.3 Association with Child Outcomes**

Follow-up analyses were conducted to examine associations between the extracted latent dimension and child socio-emotional functioning. Correlational analyses were performed between the shared canonical score and SDQ subscale scores, as well as the SDQ total difficulties score.

Statistical significance was evaluated using an alpha level of .05. Graphical visualizations were created to illustrate canonical relationships, loading patterns, and associations between latent dimensions and child socio-emotional outcomes.

## **3.6 Ethical Considerations**

The study was conducted in accordance with the ethical principles of psychological research and the Declaration of Helsinki. Ethical approval for the broader PIQ research project was obtained from the Ethics Committee of the Faculty of Psychology at the University of Vienna (Approval No. 01172).

Prior to participation, all caregivers provided informed consent electronically. Participation was voluntary, and participants could withdraw at any time without consequences.

All data were collected and stored in pseudonymized form to ensure confidentiality and data protection. The present thesis is based on secondary analyses of data collected within the broader PIQ research project.

## **4. Results**

### **4.1 Assumption Checks**

Prior to conducting the main analyses, the data were examined for their suitability for multivariate statistical procedures. Distributional properties of all variables were inspected using skewness estimates and visual inspection methods. Overall, the variables showed acceptable distributions for the planned analyses, with no evidence of severe deviations from normality.

Pairwise scatterplots and correlation matrices were additionally examined to assess linear relationships and potential multicollinearity between variables. No correlations exceeding the predefined threshold of  $r = .80$  were observed, indicating that multicollinearity was not a substantial concern.

To further evaluate the appropriateness of the data for multivariate analysis, Bartlett's tests of sphericity and Kaiser–Meyer–Olkin (KMO) measures of sampling adequacy were conducted for both variable sets. The results indicated sufficient shared variance and adequate intercorrelations among the variables to justify the extraction of shared latent dimensions using Canonical Correlation Analysis.

Overall, the assumption checks suggested that the data were suitable for the planned multivariate analyses.

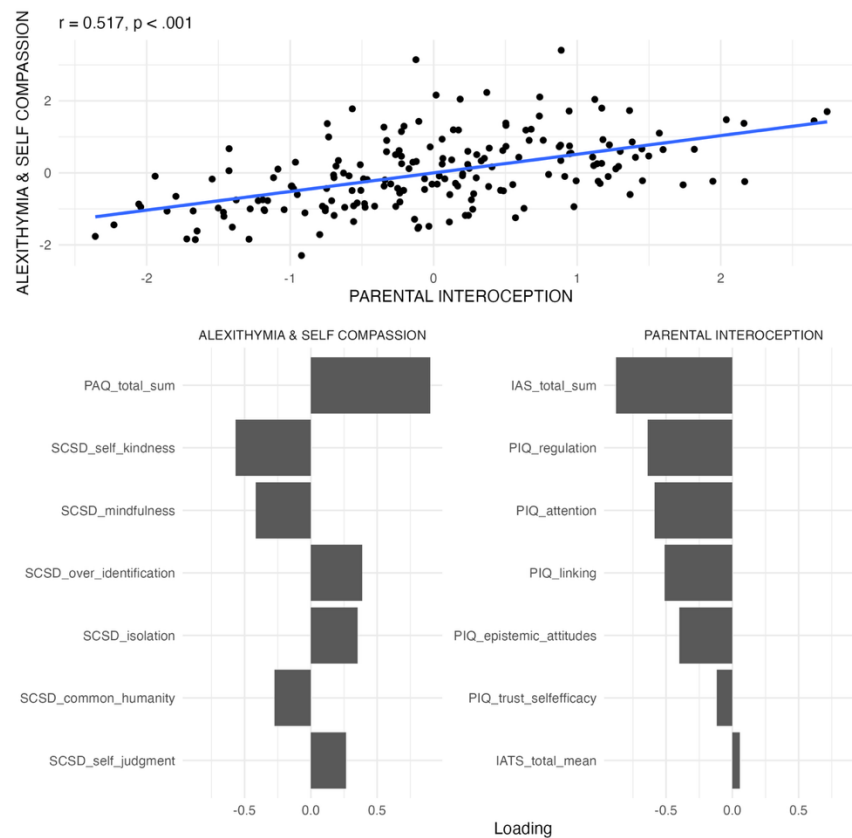
#### **4.2 Canonical Correlation Analysis**

Canonical Correlation Analysis (CCA) was conducted to examine shared latent dimensions underlying parental interoceptive sensibility, alexithymia, and self-compassion. Two statistically significant canonical roots emerged from the analysis.

The first canonical root showed a moderate positive canonical correlation,  $r = .517, p < .001$ . Examination of the canonical loadings indicated that this latent dimension was primarily characterized by higher parental interoceptive sensibility, lower alexithymia, and higher self-compassion. Within the parental interoceptive sensibility variable set, the strongest contributors included epistemic attitudes toward bodily states, trust and self-efficacy in interpreting bodily signals, and the perceived linkage between bodily and emotional processes. Within the alexithymia and self-compassion variable set, self-kindness and mindfulness showed negative loadings, whereas alexithymia, isolation, and over-identification showed positive loadings.

Taken together, the first canonical root reflected a continuous latent dimension ranging from lower parental interoceptive sensibility combined with higher alexithymia and lower self-compassion to higher parental interoceptive sensibility combined with lower alexithymia and higher self-compassion.

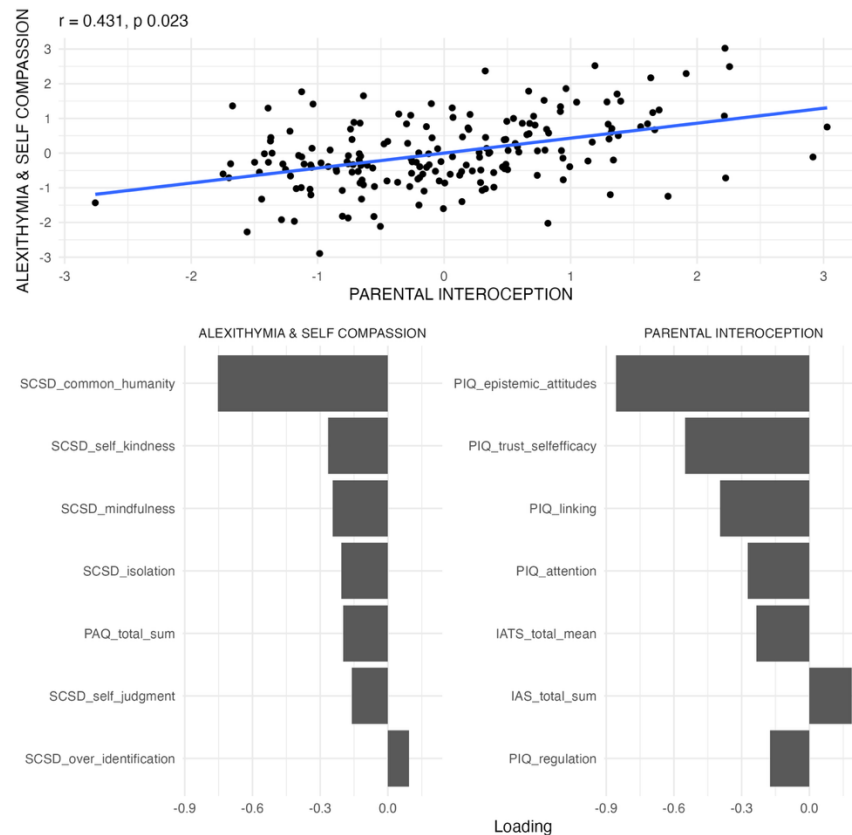
The loading structure and canonical relationship of the first root are illustrated in Figure 1.



*Figure 1 Canonical Correlation Analysis: First Canonical Root*

A second statistically significant canonical root was additionally identified,  $r = .431$ ,  $p = .023$ . However, the loading structure of the second root was less coherent and theoretically less interpretable, as the loading structure showed a more heterogeneous pattern with weaker and partially inconsistent contributions across variables compared to the first canonical root. While several variables contributed to this dimension, the pattern did not reflect a comparably clear or conceptually integrated latent

structure. Consequently, subsequent analyses primarily focused on the first canonical dimension. The second canonical root is displayed in Figure 2.



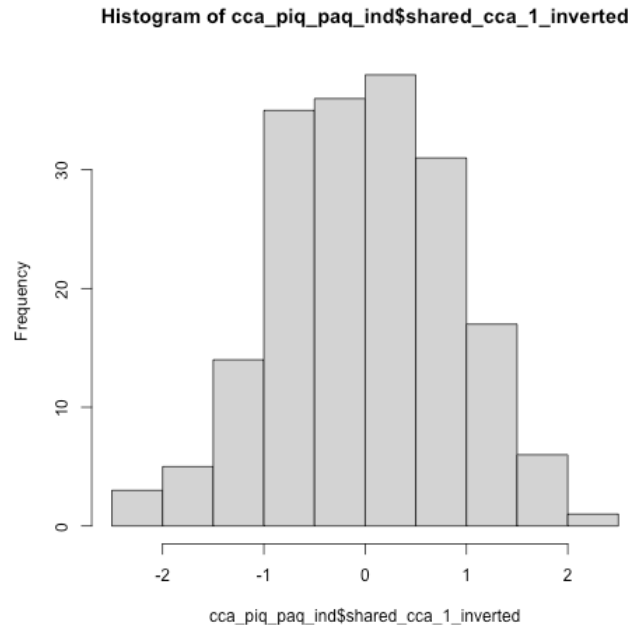
*Figure 2 Canonical Correlation Analysis: Second Canonical Root*

### 4.3 Individual Representation of the Latent Dimension

To further examine the primary latent dimension identified by the Canonical Correlation Analysis, individual canonical scores were extracted for each participant based on the first canonical root. A shared canonical score was subsequently computed by averaging the standardized canonical scores of both variable sets.

For interpretational clarity, the score was inverted so that higher values reflected a more adaptive latent dimension characterized by higher parental interoceptive sensibility, lower alexithymia, and higher self-compassion.

Visual inspection indicated that the shared canonical score showed an approximately normal distribution (see Figure 3).

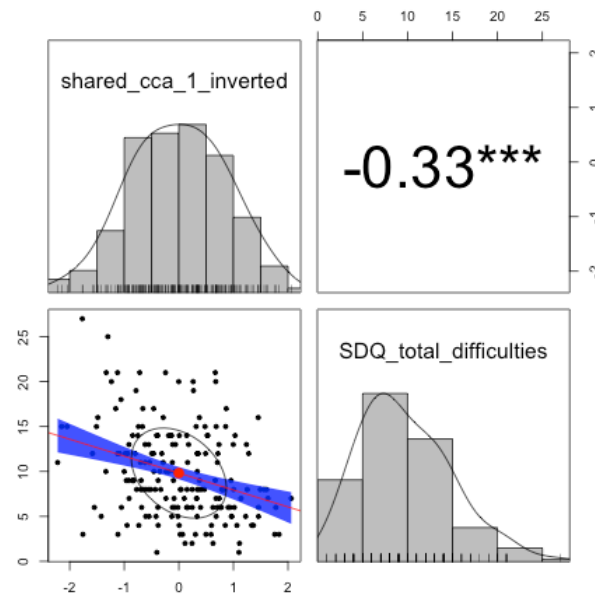


*Figure 3 Distribution of the Shared Canonical Score*

#### 4.4 Associations with Child Socio-Emotional Functioning

To examine whether the extracted latent dimension of parental functioning was associated with child socio-emotional functioning, correlational analyses were conducted between the shared canonical score derived from the first canonical root and SDQ outcomes.

The analyses revealed a moderate negative association between the shared canonical score and the SDQ total difficulties score, indicating that a more adaptive latent dimension characterized by higher parental interoceptive sensibility, lower alexithymia, and higher self-compassion was associated with lower levels of child socio-emotional and behavioral difficulties,  $r = -.33, p < .001$ . The association between the shared canonical score and SDQ total difficulties is illustrated in Figure 4.



*Figure 4 Association Between the Shared Canonical Score and SDQ Total Difficulties*

In addition to the total difficulties score, exploratory analyses examined associations between the shared canonical score and individual SDQ subscales, including emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior.

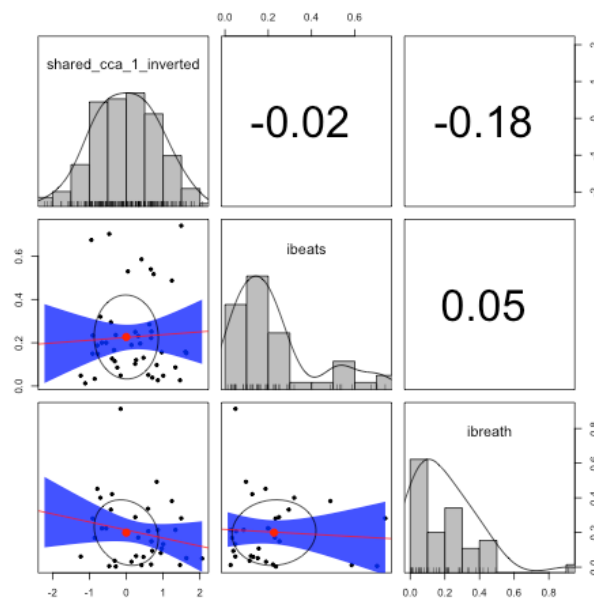
Exploratory analyses were additionally conducted to investigate potential associations between the shared canonical score and behavioral measures of interoceptive accuracy (iBEAT and iBREATH). As illustrated in Figure 5, no clear associations emerged between the shared canonical score and either behavioral measure. However, these findings should be interpreted cautiously, as the available sample size for these analyses was small and the behavioral measures are currently undergoing validation.

#### **4.5 Exploratory Associations with Behavioral Interoceptive Measures**

Exploratory analyses were conducted to investigate potential associations between the shared canonical score and behavioral measures of interoceptive accuracy (iBEAT and iBREATH). As illustrated

in Figure 5, no clear associations emerged between the shared canonical score and either behavioral measure.

However, these findings should be interpreted cautiously, as the available sample size for these analyses was small and the behavioral measures are currently undergoing validation. Consequently, the exploratory analyses were not interpreted further.



*Figure 5 Exploratory Associations Between the Shared Canonical Score and Behavioral Interoceptive Measures*

## 5. Discussion

### 5.1 Interpretation of Findings

The present study examined whether shared latent dimensions could be identified linking parental interoceptive sensibility, alexithymia, and self-compassion, and whether these dimensions were associated with child socio-emotional functioning. Using Canonical Correlation Analysis, the findings revealed a coherent multivariate pattern characterized by higher parental interoceptive

sensibility, lower alexithymia, and higher self-compassion. Furthermore, this latent dimension was associated with lower levels of child socio-emotional and behavioral difficulties.

Importantly, the identified latent dimension was associated with child socio-emotional functioning. Higher scores on the shared canonical score, reflecting a more adaptive pattern of parental functioning, were related to lower levels of child emotional and behavioral difficulties. This finding aligns with previous research highlighting the importance of parental emotional awareness and regulation for children's socio-emotional development (Dix, 1991; Rutherford et al., 2015). Parents who are more aware of and responsive to their own bodily and emotional experiences may be better equipped to respond sensitively and consistently to their children's emotional needs.

The findings additionally contribute to existing research by extending beyond univariate approaches that examine parental characteristics independently. Rather than focusing on single predictors, the present study investigated the shared variance across multiple parental processes. The results suggest that meaningful information may emerge specifically from the combination of parental interoceptive sensibility, alexithymia, and self-compassion, supporting the value of multivariate approaches in parenting research.

Although a second statistically significant canonical root emerged, its loading structure was considerably less coherent and theoretically less interpretable than the first root. Consequently, the discussion primarily focused on the first latent dimension, which represented the clearest and most conceptually meaningful multivariate pattern within the data.

Exploratory analyses involving behavioral interoceptive measures did not reveal clear associations with the shared canonical score. However, these findings should be interpreted cautiously given the small available sample size and the ongoing validation of the behavioral measures. Future research may further clarify the relationship between subjective and behavioral aspects of interoceptive processing in parenting contexts.

## 5.2 Interpretation of the Latent Dimension

Beyond the interpretation of individual findings, the present study raises broader conceptual questions regarding the nature of the identified latent dimension. The first canonical root reflected a coherent multivariate pattern linking higher parental interoceptive sensibility, lower alexithymia, and higher self-compassion. Rather than representing isolated psychological characteristics, these variables appeared to cluster along a shared dimension associated with emotional awareness, bodily self-perception, and adaptive self-regulation.

One possible interpretation is that the identified latent dimension reflects a broader form of adaptive parental socio-emotional functioning. Parents scoring higher on this dimension reported greater awareness of and trust in bodily signals, fewer difficulties identifying and describing emotions, and more self-compassionate ways of relating to personal distress. Together, these characteristics may indicate a more integrated and flexible capacity to perceive, interpret, and regulate emotional experiences.

From a theoretical perspective, this interpretation aligns with models emphasizing close links between bodily awareness and emotional processing. Contemporary interoceptive frameworks propose that bodily signals contribute fundamentally to emotional experience and self-regulation (Craig, 2002; Fotopoulou & Tsakiris, 2017). Within this framework, greater parental interoceptive sensibility may facilitate more accurate recognition and interpretation of affective states, thereby supporting adaptive emotional responding. In contrast, alexithymia may reflect difficulties translating bodily and emotional experiences into coherent emotional understanding, while self-compassion may influence how individuals regulate and respond to distress once emotional states are recognized.

Importantly, the latent dimension identified in the present study does not correspond directly to a single established psychological construct. Instead, it may represent a broader pattern of interconnected socio-emotional processes. This perspective aligns with transdiagnostic approaches in

psychology, which emphasize shared underlying mechanisms across emotional functioning and psychopathology (Aldao et al., 2010; Harvey et al., 2004). Emotional awareness, self-related regulation, and sensitivity to internal states have all been discussed as central mechanisms underlying adaptive psychological functioning across different domains.

The findings may therefore suggest that parental interoceptive sensibility, alexithymia, and self-compassion partially reflect overlapping aspects of a broader functional system involved in emotional processing and regulation. Rather than operating independently, these processes may mutually influence one another within caregiving contexts. For example, greater awareness of bodily states may support emotional clarity, while self-compassion may facilitate more adaptive responses to emotionally challenging situations. Conversely, difficulties in emotional identification may interfere with both emotional regulation and adaptive self-relating.

The parenting context may be particularly relevant for understanding this latent dimension. Parenting frequently requires caregivers to monitor both their own internal states and the emotional needs of their children in rapidly changing situations. The ability to flexibly perceive, interpret, and regulate emotional experiences may therefore represent an important component of adaptive caregiving. In this sense, the latent dimension identified in the present study may reflect broader parental capacities related to emotional attunement, self-regulation, and emotional responsiveness.

At the same time, the interpretation of the latent dimension should remain cautious. Canonical Correlation Analysis identifies statistical patterns of shared variance rather than fixed psychological entities. Consequently, the identified dimension should not be understood as a distinct diagnostic category or stable personality trait. Instead, it represents a multivariate pattern within the present dataset that may provide a useful framework for understanding how different parental processes co-occur and relate to child socio-emotional functioning.

### 5.3 Implications for Child Socio-Emotional Functioning

The present findings suggest that parental socio-emotional processes may be meaningfully related to children's socio-emotional functioning. Specifically, the identified latent dimension characterized by higher parental interoceptive sensibility, lower alexithymia, and higher self-compassion was associated with lower levels of child emotional and behavioral difficulties. These findings support theoretical perspectives emphasizing the importance of parental emotional functioning for children's developmental outcomes.

One possible explanation for this association is that parents who are more aware of and responsive to their own bodily and emotional experiences may also be better able to respond sensitively to their children's emotional needs. Greater emotional clarity and adaptive self-regulation may facilitate more consistent and supportive caregiving behaviors, particularly in emotionally demanding situations. In contrast, difficulties in identifying and regulating emotions may increase parental stress and reduce emotional availability within parent–child interactions.

The findings are consistent with developmental models highlighting the role of parental emotion regulation and emotional responsiveness in children's socio-emotional development (Dix, 1991; Morris et al., 2007). Children's emotional competencies develop within interpersonal contexts, and caregivers play a central role in shaping how emotions are expressed, interpreted, and regulated. Parents who model adaptive emotional processing and regulation strategies may contribute to more supportive emotional environments, which in turn may promote children's emotional adjustment.

The present results may additionally suggest that bodily awareness and emotional self-related processes represent relevant, yet often overlooked, components of caregiving. While previous research has frequently focused on parental stress, psychopathology, or parenting behavior directly, the current

findings indicate that more fundamental processes related to emotional awareness and self-regulation may also contribute to child socio-emotional functioning.

Importantly, the observed associations should not be interpreted as evidence of direct causal effects. Given the cross-sectional design of the study, it remains unclear whether parental functioning influences child socio-emotional outcomes, whether child difficulties affect parental emotional functioning, or whether both are shaped by additional contextual factors. Bidirectional influences between parent and child processes are likely and consistent with transactional models of development.

The findings nevertheless point toward potentially relevant targets for future prevention and intervention approaches. Supporting parents in developing greater emotional awareness, adaptive self-regulation, and self-compassion may not only benefit parental well-being but may also positively influence the emotional climate within the parent–child relationship. However, longitudinal and intervention-based research is needed to further investigate these potential developmental pathways.

#### **5.4 Theoretical Implications**

The present study contributes to existing research by adopting an integrative and multivariate perspective on parental functioning. Previous studies have typically examined parental interoceptive sensibility, alexithymia, and self-compassion separately, often focusing on isolated associations with psychological or developmental outcomes. In contrast, the current findings suggest that these constructs may be meaningfully interconnected and jointly contribute to broader patterns of socio-emotional functioning in caregivers.

A central theoretical implication of the study concerns the conceptualization of parental emotional functioning. The identified latent dimension suggests that bodily awareness, emotional clarity, and adaptive self-regulation may not represent entirely independent processes, but rather overlapping aspects of a broader functional system. This aligns with contemporary perspectives

emphasizing the interconnected nature of emotional awareness, interoceptive processing, and regulation mechanisms (Craig, 2002; Fotopoulou & Tsakiris, 2017).

The findings additionally support transdiagnostic approaches in psychology, which focus on shared underlying mechanisms across emotional functioning and mental health (Aldao et al., 2010; Harvey et al., 2004). Constructs such as emotional awareness, self-regulation, and self-related processing have increasingly been discussed as central processes underlying adaptive and maladaptive functioning across a range of psychological domains. The present study extends this perspective to parenting contexts by suggesting that parental interoceptive sensibility, alexithymia, and self-compassion may together reflect a broader dimension relevant to caregiving and child development.

The study also highlights the theoretical value of multivariate approaches in parenting research. By using Canonical Correlation Analysis, the present study was able to examine shared variance across multiple parental characteristics simultaneously. This approach allowed for the identification of integrated latent dimensions rather than isolated linear associations, thereby providing a more comprehensive representation of parental socio-emotional functioning.

Importantly, the findings raise questions regarding how adaptive parental functioning should be conceptualized in future research. The latent dimension identified in the present study may overlap with constructs such as emotional intelligence, emotion regulation capacity, reflective functioning, or broader dimensions of psychological flexibility. Future research may therefore benefit from investigating how these related constructs interact and whether they represent partially overlapping components of a broader socio-emotional system.

At the same time, the interpretation of the identified latent dimension should remain cautious. Canonical Correlation Analysis identifies statistical patterns within a given dataset and does not establish the existence of a discrete psychological entity. Consequently, the latent dimension identified in the present study should not be interpreted as a fixed trait or diagnostic category. Rather, it represents a

multivariate pattern that may help explain how different parental processes co-occur and jointly relate to child socio-emotional functioning.

## **5.5 Practical Implications**

The present findings may have practical implications for parenting support, prevention programs, and interventions targeting family well-being. The identified latent dimension suggests that parental interoceptive sensibility, emotional awareness, and self-compassion may jointly contribute to adaptive parental functioning and may therefore represent relevant targets for supportive interventions.

One potential implication concerns interventions aimed at strengthening parents' awareness of bodily and emotional states. Approaches that promote mindfulness, emotional awareness, or self-reflection may help caregivers become more attuned to their internal experiences and improve their ability to regulate emotions in stressful parenting situations. Greater awareness of bodily and emotional processes may in turn support more sensitive and responsive caregiving behaviors.

The findings additionally highlight the potential relevance of self-compassion in parenting contexts. Parents frequently encounter emotionally demanding situations, uncertainty, and self-critical thoughts related to caregiving. Self-compassion-based approaches may help reduce excessive self-criticism and support more adaptive coping strategies when dealing with parental stress or emotional challenges. Previous research has shown that self-compassion interventions can improve emotional regulation and psychological well-being (Kirby et al., 2017), which may also have indirect benefits for parent–child interactions.

The results may be particularly relevant for families experiencing elevated stress or difficulties in emotional communication. Parents with lower emotional awareness or higher alexithymia may benefit from interventions that explicitly focus on recognizing, labeling, and communicating emotions.

Supporting parents in developing these capacities may contribute to more emotionally supportive family environments and potentially reduce children's emotional and behavioral difficulties over time.

Importantly, the present findings do not imply that parental functioning alone determines child socio-emotional outcomes. Child development is shaped by multiple interacting factors, including temperament, family environment, social context, and broader environmental influences. Nevertheless, the results suggest that parental emotional and self-regulatory processes may represent meaningful components within these broader developmental systems.

The practical implications of the present study should additionally be interpreted cautiously due to the cross-sectional nature of the data. While the findings identify associations between parental functioning and child socio-emotional outcomes, causal conclusions cannot be drawn. Future longitudinal and intervention-based studies are needed to determine whether changes in parental interoceptive sensibility, emotional awareness, or self-compassion lead to measurable improvements in child socio-emotional functioning.

## **5.6 Limitations**

Several limitations should be considered when interpreting the findings of the present study.

First, the study employed a cross-sectional design, which limits conclusions regarding causality or developmental directionality. Although associations were identified between parental functioning and child socio-emotional outcomes, it remains unclear whether parental emotional processes influence children's functioning, whether child difficulties affect parental functioning, or whether both are shaped by additional contextual factors. Longitudinal research is necessary to better understand the temporal dynamics underlying these associations.

Second, all primary variables included in the main analyses were assessed using self-report questionnaires completed by caregivers. This may have increased the risk of shared method variance

and reporting biases, as both parental characteristics and child socio-emotional functioning were reported by the same individual. Parents with higher emotional distress or lower self-awareness may differ systematically in how they evaluate both themselves and their children.

A further limitation concerns the absence of detailed demographic and developmental information within the final analytical dataset. Due to data matching limitations within the broader project database, variables such as child age could not be reliably linked to the questionnaire data used in the present analyses. Consequently, developmental differences between children could not be examined or statistically controlled. Given the potentially wide developmental range represented in the sample, future research should incorporate more detailed developmental information to better contextualize child socio-emotional outcomes.

Additionally, the study focused primarily on subjective measures of parental interoceptive sensibility rather than objective behavioral indices of interoceptive processing. Child functioning was also assessed via caregiver report and may therefore be influenced by parental perception biases. Although exploratory analyses involving behavioral interoceptive measures (iBEAT and iBREATH) were conducted, these analyses were limited by small sample sizes and ongoing validation procedures. The relationship between subjective and objective aspects of interoceptive processing therefore remains unclear within the present study.

The interpretation of the identified latent dimension should also remain cautious. Canonical Correlation Analysis identifies statistical patterns of shared variance within a given dataset and does not establish the existence of a discrete psychological construct. While the first canonical root showed a theoretically coherent pattern, latent dimensions derived from multivariate analyses may vary across samples and methodological approaches. Replication in independent samples is therefore necessary.

Finally, the study sample may not be fully representative of the broader population of caregivers. Participation was voluntary and based on recruitment through an existing participant

database, which may have introduced selection biases. For example, parents with greater interest in psychological research or emotional topics may have been more likely to participate. This may limit the generalizability of the findings.

## 5.7 Future Research

The present findings provide several directions for future research. First, longitudinal studies are needed to better understand the developmental relationships between parental interoceptive sensibility, emotional functioning, and child socio-emotional outcomes. The cross-sectional design of the current study does not allow conclusions regarding temporal or causal processes. Future longitudinal approaches may help clarify whether parental emotional and bodily self-awareness contribute to later child socio-emotional functioning, whether child characteristics influence parental processes over time, or whether bidirectional influences emerge within parent–child interactions.

Future research may additionally benefit from incorporating more diverse assessment methods. The present study primarily relied on caregiver self-report questionnaires, which may be influenced by subjective biases and shared method variance. Including observational measures of parent–child interaction, clinician-rated assessments, or physiological indicators may provide a more comprehensive understanding of how parental emotional functioning relates to caregiving behavior and child development.

A particularly important direction concerns the relationship between subjective and objective aspects of interoceptive processing. While the present study focused primarily on parental interoceptive sensibility, future research should further investigate how subjective bodily awareness relates to behavioral and physiological measures of interoception. Larger samples and validated behavioral paradigms, including iBEAT and iBREATH measures, may help clarify whether subjective and objective interoceptive processes contribute differently to parenting and child socio-emotional functioning.

Future studies may also further investigate the theoretical nature of the identified latent dimension. The present findings suggest that parental interoceptive sensibility, alexithymia, and self-compassion may reflect interconnected aspects of broader socio-emotional functioning. However, it remains unclear how this latent dimension relates to other constructs relevant to parenting and mental health, such as emotion regulation, reflective functioning, attachment, stress reactivity, or psychological flexibility. Examining these relationships may contribute to a more refined theoretical understanding of adaptive parental functioning.

In addition, future research could explore whether specific components of the latent dimension are more strongly associated with particular child outcomes. While the present study primarily focused on global socio-emotional functioning, analyses of individual SDQ subscales may provide more differentiated insights into how parental emotional processes relate to domains such as emotional symptoms, hyperactivity, peer difficulties, or prosocial behavior.

Finally, intervention-based research may help determine whether strengthening parental emotional awareness, interoceptive sensibility, or self-compassion can positively influence parent–child interactions and child socio-emotional functioning. Such approaches may be particularly relevant for families experiencing elevated stress or emotional difficulties and could contribute to the development of more targeted prevention and support programs.

## **6. Conclusion**

The present study investigated shared latent dimensions linking parental interoceptive sensibility, alexithymia, and self-compassion, and examined their associations with child socio-emotional functioning. Using Canonical Correlation Analysis, the findings identified a coherent multivariate pattern characterized by higher parental interoceptive sensibility, lower alexithymia, and higher self-

compassion. This latent dimension was additionally associated with lower levels of child emotional and behavioral difficulties.

The findings suggest that parental emotional functioning may be more comprehensively understood through integrated and multidimensional perspectives rather than isolated psychological constructs. By examining shared variance across multiple parental characteristics, the study highlights the interconnected nature of bodily awareness, emotional clarity, and adaptive self-regulation within caregiving contexts.

Furthermore, the results underscore the potential relevance of parental socio-emotional functioning for child development. Parents who report greater awareness of bodily and emotional experiences, alongside more self-compassionate ways of responding to distress, may also report lower levels of socio-emotional difficulties in their children.

At the same time, the findings should be interpreted cautiously given the cross-sectional design, reliance on self-report measures, and limited availability of developmental and behavioral data. Future longitudinal and multimethod research is needed to further investigate the mechanisms linking parental emotional functioning and child socio-emotional development.

Overall, the present study contributes to the growing literature on interoceptive and emotional processes in parenting by adopting a multivariate perspective and identifying a meaningful latent dimension of parental functioning associated with child socio-emotional outcomes.

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### Zusammenfassung

Die frühe sozio-emotionale Funktionsfähigkeit von Kindern wird durch komplexe Wechselwirkungen mit den emotionalen und selbstregulatorischen Fähigkeiten ihrer Bezugspersonen beeinflusst. In diesem Zusammenhang beschreibt interozeptive Sensibilität die subjektive Wahrnehmung und Interpretation innerkörperlicher Signale bei Eltern, Alexithymie bezeichnet Schwierigkeiten beim Identifizieren und Beschreiben von Emotionen, und Selbstmitgefühl beschreibt eine unterstützende und nicht wertende Haltung gegenüber sich selbst in emotional belastenden Situationen. Die vorliegende Studie untersucht die multivariaten Zusammenhänge zwischen elterlicher interozeptiver Sensibilität, Alexithymie und Selbstmitgefühl sowie deren Zusammenhang mit der sozio-emotionalen Funktionsfähigkeit von Kindern.

Die Daten wurden im Rahmen des Forschungsprojekts *Parental Interoceptive Sensibility* an der Universität Wien erhoben. Zur Identifikation gemeinsamer Zusammenhangsmuster zwischen den untersuchten Konstrukten wurde eine Canonical Correlation Analysis (CCA) durchgeführt, wodurch komplexe, multidimensionale Beziehungen zwischen elterlichen Merkmalen untersucht werden konnten. Die Ergebnisse zeigten eine signifikante kanonische Korrelation, die eine latente Dimension widerspiegelte, welche durch höhere interozeptive Sensibilität und höheres Selbstmitgefühl sowie geringere Alexithymie charakterisiert war. Diese Dimension war mit einer günstigeren sozio-emotionalen Funktionsfähigkeit der Kinder assoziiert, gemessen mit dem *Strengths and Difficulties Questionnaire*.

Die Befunde legen nahe, dass emotionale und körperbezogene Wahrnehmungsprozesse von Eltern gemeinsam relevant für das Verständnis kindlicher sozio-emotionaler Outcomes sind. Langfristig könnten die Ergebnisse zur Entwicklung präventiver und intervenierender Ansätze beitragen, die darauf abzielen, emotionale Bewusstheit, Selbstregulation und Selbstmitgefühl bei Eltern zu stärken.