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Review

Creating Inclusive Classrooms for Highly Dysregulated Students: What Can We Learn from Existing Literature?

Emma Goodall [1,*], Charlotte Brownlow [1], Erich C. Fein [2] and Sarah Candeloro [3]

[1] Centre for Health Research, University of Southern Queensland, Toowoomba 4350, Australia; charlotte.brownlow@usq.edu.au
[2] School of Psychology and Wellbeing, University of Southern Queensland, Toowoomba 4350, Australia; erich.Fein@usq.edu.au
[3] School of Psychology, University of Adelaide, Adelaide 5005, Australia; sarah.candeloro@student.adelaide.edu.au
* Correspondence: emma.goodall@usq.edu.au

Abstract: The ability to self-regulate is a key focus for educators, especially for neurodivergent students, such as those with ADHD, fetal alcohol syndrome, mental health difficulties, autism, and/or anxiety. Students not being able to self-regulate frequently results in their behaviours being labelled as "naughty" or "challenging" by teachers. Continued dysregulation can lead to periods of suspension and exclusion, impacting both attendance rates for students and their broader families. Previous research has shown that the impacts of poor self-regulation can be wide-ranging, spanning both social and academic outcomes. The broad negative impact of poor self-regulation means that it is important to support families and classroom teachers to effectively improve children's self-regulation. However, to support families and educators, there is a need to develop and deploy a theoretical framework to suggest why self-regulation may be under-developed and, conversely, how self-regulation may be effectively developed across a wide range of contexts. This paper considers current literature exploring the links between individual experiences of emotions and connections with core abilities of interoception, self-regulation, emotional intelligence, and metacognition. It outlines a hypothesised model of how these abilities intertwine and how supporting core building blocks within educational settings can enable supportive and inclusive educational contexts, providing positive experiences for students and teachers alike.

Keywords: dysregulation; inclusive classrooms; interoception; self-regulation

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1. Introduction

The need for a better understanding of self-regulation became evident to the lead author in late 2017 following requests from a number of schools in South Australia for support with highly dysregulated students. Most of these young people had an autism spectrum diagnosis and ranged in age from 4–18 years, indicating difficulties across their educational career. For this paper, we consider dysregulation to refer to the state of being unable to self-manage or self-regulate, with highly dysregulated students being in this state for sustained periods of time. For some children, this can have significant impacts on their self-management of emotions and behaviours, which can frequently interrupt learning for both short- and long-term periods. It is therefore crucial to understand why such dysregulation occurs and what educators can do to support students and create an inclusive educational environment. The importance of emotional regulation has been a focus for some years, notably in the work of Prizant and Laurent [1,2]. However, this paper seeks to extend discussions and focuses on the importance of interoception in facilitating emotional regulation.

In educational settings, dysregulation is often interpreted or described as "challenging behaviour" or students being "naughty" or "unmanageable". Delays or difficulties with

self-management and self-regulation in children and young people come with a high cost to both those individuals themselves, as well as their peers, families, and involved professionals [3–6]. Disengagement in learning can become the norm for highly dysregulated students with repeated suspensions and exclusions. This results in low or no attendance from as young as six or seven years old, with some parents having to give up work to be able to pick their child up from school early most days of the week. For secondary school students, this can result in additional costs, with some highly dysregulated students having numerous changing school placements.

The concept of self-management refers to ongoing, dynamic, and adaptive behaviours which are made as responses to internal states relating to biological homeostasis needs within the body. In contrast, self-regulation refers to the individual's ability to control his or her behaviour towards goals and helpfully express social-emotional needs and wants, thoughts, emotions, and actions [7]. Pre-school and early years students are not expected to be able to fully self-regulate, but once students enter year two or above, teachers often expect them to be able to self-manage and self-regulate, reacting punitively to transgressions rather than teaching pre-requisite skills to these students.

Conceptually, there is a distinction between self-management and self-regulation based on responses to internal states relating to biological homeostasis needs. However, practical self-regulatory behaviours can arise from self-management needs. For example, Nigg highlighted that poor self-regulation arising from self-management demands is associated with increased mental health difficulties, increased physical ill-health, and lower life outcomes for children, which impact both social and academic outcomes [6].

The wide-ranging negative impact of poor self-regulation means that it is important to support families and classroom teachers to effectively improve children's self-regulation, especially as related to self-management needs, which can be among the most pressing demands for self-regulation. Self-regulation enables children to engage in learning activities [8], and with poor self-regulation comes less engagement in learning and higher rates of internalising and externalising (disruptive) behaviours [9]. Therefore, families and educators can struggle to manage children and young people who are highly dysregulated and unable to self-regulate. Fostering the development of self-regulation in early childhood offers the potential to ensure early education is effective for all children [8]. However, to support families and educators, there is a need to develop and deploy a theoretical framework to suggest why self-regulation may be under-developed and, conversely, how self-regulation may be effectively developed across a wide range of contexts.

Dysregulated behaviour often arises from difficulties with self-management through a lack of recognition and attention to internal bodily signals. For example, when a student runs out of the classroom to go to the toilet five minutes after returning from recess or lunch, their behaviour is often interpreted as disruptive. When children are being toilet trained, they normally learn that they are going to need to go to the toilet soon from the adults around them. These adults use the child's external body signals/cues such as wiggling or clutching to identify that the child needs to go to the toilet. Children with good internal bodily awareness can link their internal body signals to those external cues. Over time, these children start to be more aware of how their body feels when their bladder is full or their bowel needs emptying. They start to be able to anticipate these states and know how long they can wait and can go before the need becomes an imperative. However, for children (and adults) with poor bladder/bowel awareness and/or nerve damage, they are not able to wait and need to go almost immediately when they do finally notice the urge. Once a student is more than about five or six years old, teachers rarely realise that the young person may be missing such basic bodily awareness skills and therefore interpret the running out of the classroom as either work avoidance, poor impulse control, or dysregulated behaviour. Therefore, inclusive classrooms need to acknowledge the impacts of atypical and poor internal bodily awareness through inclusive practices rather than punitive measures.

Within developmental perspectives, emotions and actions are widely understood to have a contextual element, in that individuals express emotions or carry out actions

in response to their thoughts and/or their experience of the context around them [9,10]. Autistic young people have been found to experience greater difficulties with emotion regulation than their neurotypical peers [11]. Autistic students and students who experience Attention Deficit Hyperactivity Disorder (ADHD), as well as students with Oppositional Defiant Disorder and/or Conduct Disorder are characterised by higher rates of learning difficulties and school problems, including expulsion and/or dropping out of school [12]. Grecucci and colleagues found that emotions can also impact imitative actions (for example, if someone shouts loudly and excitedly, people around them are more likely to shout loudly and excitedly back) [13]. For example, Mayer and colleagues' conception of emotional intelligence has individuals engaging in complex information processing about their own and others' emotions, with behaviour guided by this processed information [14]. Therefore, in order to process your own emotions, you need to be aware of what emotions you are experiencing. This awareness is a key aspect of interoception. Before considering these elements in further detail, we would like to make a note on the terminology that we have chosen for this paper. Within this paper, Autistic-specific, identity first language has been used where appropriate following the recommendations of Botha et al. [15] and Bottema-Beutel et al. [16]. This reflects the importance of inclusive language and resisting ableist discourse surrounding the narrative that

2. Self-Managing Behaviours

Managing our own behaviour can be a skill that requires internal attention and broader reflections on contexts and bodily signals. We propose here that at the core of successful self-regulation are key concepts of interoception, emotional intelligence, and metacognition [17].

2.1. Interoception

On a neuroanatomical level, interoception has mostly been linked to two key cortical areas; the insular cortex (IC) and the anterior cingulate cortex (ACC) [18]. "Interoception includes the processes by which an organism senses, interprets, integrates, and regulates signals from within itself. The action of 'sensing' denotes communication from physiological systems outside the (central nervous system) CNS to inside the CNS, through the commonly called ascending pathways, whereas the action of 'regulating' refers to communication from the brain to other physiological systems via descending pathways" [19] (p. 40). On an experiential level, interoception is sometimes referred to as somatic awareness and is colloquially known as mindful body awareness or the eighth sense, with the other seven being sight, hearing, taste, smell, touch, proprioception, and vestibular reception [20]. While most people are familiar with sight, hearing, taste, smell, and touch, the vestibular and proprioceptive senses are less well known and are focused on the awareness of the whole body. Vestibular reception refers to our sense of balance, which is governed by the inner ear, and proprioception refers to the sense of where our body is placed in space, for example, where our head ends and space starts, which is useful to prevent us banging our heads on overhanging objects. Theoretically, interoception can be described as mindful body awareness, as it is the conscious perception (mindful) of internal body signals (body awareness) [17].

Interoception is the awareness of the physiological state of the body, possibly originating in the visceral organs. Interoception is also a critical antecedent to self-regulation at a physiological and psychological level because it is implicated in maintaining homeostasis (achieving a state of equilibrium in physiological processes) and regulating emotions [18]. Much like the other senses, interoception has at least two components: interoceptive awareness and interoceptive accuracy [21]. Interoceptive awareness refers to metacognitive abilities relating to a person's own bodily performance [22]; the individual is aware of their internal body signals in relation to the body's needs (for homeostasis) and wants (emotions). Researchers have currently referenced interoceptive accuracy—solely in relation to heartbeat detection, rather than more generally as an accurate perception of internal

body signals. For example, Garfinkel and colleagues defined interoceptive accuracy as "performance on objective behavioural tests of heartbeat detection" [23] (p. 65). Whilst the facets explain different aspects of interoception, some argue there is no significant correlation between each of them, suggesting that interoception is not a single entity, but a concept with multiple dimensions [24].

Interoceptive atypicality is implicated in many psychological and neuro-developmental conditions, and neurodivergent individuals particularly tend to show a variety of differences in interoceptive accuracy and awareness [18]. Indeed, poor interoception is implicated in poor self-regulation, which, as Nigg reported, is also implicated in psychological and developmental disorders [6]. Targeting interoceptive abilities early in development may be an effective way to increase the ability of individuals to self-regulate through facilitating their awareness of their internal body states, feelings, and emotions. Indeed, in Mayer and colleagues' four-branch model of emotional intelligence, interoception is a precursor to all four branches, indicating that improving interoception will increase emotional intelligence overall, as well as increasing the ability to self-regulate [14].

It has been estimated that approximately 30–50% of those with a developmental disorder have a co-occurring mental health issue [25]. However, mental health difficulties may frequently remain underdiagnosed, potentially due to overshadowing of the initial developmental disability diagnosis [25]. This underdiagnosis may be one of the reasons that individuals with neurodevelopmental disabilities may be perceived as being dysregulated or deliberately naughty, as opposed to being in need of support to identify and manage their emotions. This is often reflected in education, where these students are more likely to be suspended and/or excluded [26]. Bearing in mind that both developmental disorders and mental health difficulties are associated with low levels of interoceptive awareness and high levels of dysregulation, recent research has confirmed that improving interoceptive awareness in students decreases levels of dysregulation [9].

The high rates of anxiety seen in autistic people can lead to dysregulation, school difficulties, and disengagement from learning [22]. Furthermore, around 50% of autistic individuals also experience alexithymia, which is characterised by atypical emotional expression and recognition [27,28]. Thus, if interoception is involved in mental health disorders and those with developmental disabilities are more at risk, they should be a target population for interoceptive activities to minimise the potential for future mental health issues.

2.2. Emotional Intelligence

Emotional intelligence can be considered a further key component of an individual's ability to self-regulate. The core understanding of emotional intelligence is the attention to, accurate appraisal, and understanding of, appropriate expression of, and adaptive regulation of emotions to benefit oneself and others [29]. In 1995, Goleman's best-selling book "Emotional Intelligence" suggested that emotional self-regulation is the pinnacle of emotional intelligence [30]. Individuals with higher emotional intelligence tend to use more helpful or adaptive coping strategies when faced with stress, and emotional intelligence has been found to increase resilience to stress [31,32]. Emotional intelligence has also been found to be significantly correlated with overall health, including mental, psychosomatic, and physical health [33], in the same way that low levels of interoception are correlated with poor mental health.

2.3. Metacognition

Metacognition, often referred to as "thinking about thinking", can be defined as the processes involved in the monitoring of one's cognitions in order to control one's behaviour [34]. Metacognitions are higher-order thoughts about one's primary thoughts. Metacognitive processes can magnify, lessen, or reverse our primary thoughts and are therefore highly influential and are thought to be vital for self-regulation [35]. The ability to reflect on our own experiences, thoughts, feelings, and emotions is an important process

in self-awareness and, in fact, higher metacognitive awareness predicts higher academic achievement [36]. Higher levels of metacognition are also associated with more effective self-regulation based on conceptual linkages [37] and empirical evidence [38]. Thus, it is likely that improving cognitive awareness of one's feelings and emotions will improve academic outcomes.

2.4. Self-Regulation

The previous concepts, we argue, are all important for an individual in order to self-regulate their behaviour. Bandura's seminal work, the Social Cognitive Theory of Self-Regulation [39], states that self-regulation is comprised of three processes: self-monitoring in relation to the causes and effects of one's own behaviour, judgement of such behaviour in relation to personal standards and environment, and affective self-reaction. Self-monitoring can be understood to be active noticing or conscious feedback seeking, which is interoceptive awareness, without which judgement and self-reaction have no accurate contextual basis. Bandura argued that self-regulation depends on the consistency, timing, and fidelity of self-monitoring and that it uses a negative feedback mechanism [39]. Such mechanisms are homeostatic in nature in that they detect deviations from the optimal state in order to initiate behaviour that drives allostasis, the process that facilitates the return to equilibrium. Thus, self-regulation can be considered an essential part of maintaining homeostasis. Self-monitoring is the noticing of oneself, both via internal and external body signals, which by definition includes interoceptive awareness, the conscious perception of internal body signals. Self-control can be defined through different measures such as delay of gratification, willpower, executive control, self-discipline, and self-regulation. Thus, those with optimal self-control can regulate their behaviour, emotions, and attention in order to achieve their long-term goals [40].

The "Dunedin" longitudinal study began following a general sample of children born in New Zealand in 1972–1973. Following an initial assessment at 3 years old, the participants have been followed up every two years until aged 15 years, and then again at ages 18, 21, 26, 32, 38, and most recently at 45 years. The study is ongoing to date. [41,42]. The study found that children who were highly dysregulated at age three were more likely in adulthood to develop and experience gambling problems, substance dependence, financial struggle, poorer parenting skills, poorer health, employment difficulty, interpersonal conflict, being a single parent, and experience higher rates of criminal offending [4,5]. As it may be easier to improve self-regulation in children than it is to improve their social-economic status or the other impacted life outcomes, targeting the improvement of self-regulation skills in young children would seem likely to effectively improve both educational outcomes and overall quality of life long-term.

3. Hypothesised Link between Interoception, Metacognition, and Emotional Intelligence

The proposed link between interoception, metacognition, and emotional intelligence seems logical given the role of each of them in self-awareness. Craig reviewed a collection of studies regarding the activation of the Anterior Insular Cortex (AIC), finding that it was involved in mechanisms requiring human awareness [43]. These mechanisms include attention and goal directed attention, cognition, music, time perception, and awareness of sensation, movement, visual information, and auditory information. Craig proposes that the neural basis of awareness relies on the awareness of the physiological state of one's body [43].

Interoception has been found to be associated with emotional processing, emotional regulation, and self-compassion, suggesting that the ability to sense one's internal body states is fundamental to emotional intelligence [44,45]. Furthermore, there is evidence to suggest that emotions are experienced as being more intense when there is increased interoceptive sensitivity to bodily sensations [46]. In contrast, those with alexithymia, who have difficulty processing and expressing emotions, often show decreased interoception

and tend to focus on exteroceptive over interoceptive signals [45,47]. There is also neuroanatomical evidence that suggests interoception and emotions may be neurologically linked. An example of this neuroanatomical evidence is affective feelings, which trigger joint activation of the anterior insular cortex (AIC) and the anterior cingulate cortex (ACC), which are both involved in interoception. Interoception and emotions may be based in similar neural networks or, indeed, relate directly [43].

Furthermore, emotional knowledge, emotional regulation, and empathy are all positively correlated with cognitive regulation, knowledge, and processing, which suggests a link between emotional intelligence and metacognition [48]. Cognition and emotion can also be linked through the functional connectivity of neural networks. The "salience" network includes the AIC, ACC, amygdala, and hypothalamus and is known to be involved in emotions, whilst the "executive control" network includes the dorsolateral prefrontal cortex and parietal areas. Areas of the AIC and medial prefrontal cortex (MPFC) near the ACC are seen to be activated in both networks, suggesting a connectivity between cognition and emotion [49].

Together, these results suggest that interoception, metacognition, and emotional intelligence are all linked and, when combined, provide the basis of human self-awareness and self-regulation [3]. Without interoception, it is probable that children and young people will be unable to develop metacognitive emotional abilities [50]. The following table (Table 1) illustrates the links between metacognition, social-emotional intelligence, and interoception. From Table 1 below, it can be seen that at the highest level of emotional metacognition (i.e., being able to self-assess cognitive processes to direct personal behaviour) [51], a person who has interoceptive awareness that allows them to notice and then manage their own internal body states and responses can effectively demonstrate socio-emotional self-regulation.

Table 1. Links between increasing levels of metacognition, emotional intelligence, and interoception.

Metacognition (Wellman, 1985) [51]	**Emotional Intelligence as Foundation to Social-Emotional Skills (Goleman, 1995) [30]**			**Interoception (Goodall, 2016) [50]**
	Emotional Skills	**Cognitive Skills**	**Behaviour Skills**	
Knowledge that mental states exist.	Labelling feelings.	Self-talk.	Non-verbal communication.	Noticing internal body states.
Knowledge that there are distinct mental processes.	Expressing feelings.	Understanding social cues and how others perceive you.	Effective verbal communication.	Recognising and naming internal body states.
Knowledge that these distinct processes are a function of cognition.	Identifying feelings as responses to stimuli.	Being able to problem solve in response to impulses and anticipating consequences.	Control of impulses.	Understanding the link between internal body states and feelings/emotions.
Knowledge that cognition is influenced by context (internal and external).	Understanding and responding to intensity of feelings.	Understanding the perspectives of others and societal norms.		Understanding the effects of others and the wider environment on self, internal body states, and feelings/emotions.
Being able to self-assess cognitive process to direct personal behaviour.	Emotional self-regulation.	Self-awareness.	Behavioural self-regulation.	- Managing responses of internal body states to external stimuli. - Socio-emotional self-regulation

Table 1 highlights the links between increasing levels of metacognition and emotional intelligence skills, where the skill of self-assessing cognitive process is used to direct personal behaviour, which equates with both emotional and behavioural self-regulation—the highest skill in interoception. The table also illustrates the parallels between the levels of metacognition and interoception, which both start with knowing and noticing mental states and end with self-regulation. In order to improve interoception and therefore self-regulation, the ability to notice internal body signals, interoceptive awareness needs to be increased. This is important in an educational context where behaviour management does not acknowledge or respond effectively to the role of interoception in behaviours. Therefore, dysregulated students with atypical or poor interoception will be disproportionately removed from the classroom, whether temporarily or longer term [27].

Studies examining behaviour and brain changes have found that mindfulness interventions such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness Training (MT) using Interoceptive Awareness (IA) can alter the brain's structure, including changing the

grey matter density and improving functional connectivity of related areas. This improved functional connectivity of the areas related to interoceptive awareness should decrease dysregulation, increasing the self-regulation skills and emotional intelligence of children and young people who are currently struggling to identify and/or express their emotions helpfully, which in turn should enable them to engage in learning more readily.

Hypothesised Link between Interoception and Self-Regulation

There is a paucity of current research specifically examining the relationship between developing interoceptive awareness and improving self-regulation. A study by Zamariola and colleagues [52] examined the relationship between interoception and emotional regulation using a mixed methods approach. The results suggested that those with higher interoceptive skills were more positive when faced with challenges and had better awareness of the effectiveness of their regulation strategies. In comparison, those with low interoceptive skills reported feeling confused in the face of negative emotions. Although this appears to support the link between interoception and self-regulation, the results of this study were subjective, and the sample size was small [52]. Thus, larger studies investigating this relationship are needed. The Department for Education in South Australia has trialled teaching interoception as a strategy for developing self-regulation and decreasing challenging behaviour for two years and is now rolling this strategy out state wide, with over 225 schools currently implementing interoceptive awareness teaching as a proactive positive behaviour management strategy. The trial research demonstrated a significant decrease in challenging behaviour over 8–10 weeks of implementation, with pro-social behaviour increasing after 16–20 weeks [9].

One commonality shared by interoception and self-regulation is their required input into sustaining homeostasis. Driven by negative feedback mechanisms detecting deviations from the set point of factors such as temperature, pH, and oxygen levels, homeostasis drives activity to return the body to equilibrium [46]. One aspect of homeostatic balance is the interplay between the sympathetic and parasympathetic branches of the autonomic nervous system (ANS) [53]. The ANS is responsible for regulating the internal environment and innervating the blood vessels, visceral organs, and glands. The sympathetic branch activates the body for activity, especially in response to a threat. This is commonly known as the "fight or flight" response, or more accurately, the survival response, which includes not just fight or flight, but also freeze, flop, or drop. The parasympathetic nervous system activates gastrointestinal and urinary functions and thus is coined to be responsible for "rest and digest" [48]. Both self-regulation and interoception interact with the parasympathetic and sympathetic nervous systems and thus appear to be linked in some way [54,55].

Self-regulation strategies may be able to help students in maintaining autonomic homeostasis whilst under the stress of examinations or experiencing stressors in other contexts. The effects of self-regulation strategies including focusing on breathing, body relaxation with autogenic training, and mentally visualising themselves passing the exam were examined by Shcherbatykh [56]. These techniques were found to increase activity of the parasympathetic nervous system, thus helping balance out the activation of the sympathetic nervous system due to the perceived threat of the exam [56]. Activities such as focusing on breathing and on the body involve focusing on interoceptive signals of the body and thus demonstrate how interoceptive awareness can improve homeostasis and counteract sympathetic nervous system dominance or overload. Children and young people with decreased interoceptive sensitivity often show a disconnect between their external environment and internal body state, which can lead to social problems and a poor sense of self [25] and exacerbated by the responses of others to their dysregulated behaviours.

In summary, self-regulation has been found to be positively correlated with psychological wellbeing, including aspects of personal growth and relatedness, life purpose, and self-acceptance [57]. Although self-regulation skills usually develop in early childhood, the neuroplasticity of the human brain allows it to be taught and learnt throughout the life span [58]. Interventions teaching adolescents self-regulation strategies have been found

to improve self-esteem and internalising behaviour [9,59], whilst emotional dysregulation was found to be linked to suicidal behaviour and ideation [47].

For example, recent work has produced separate evidence for the effectiveness of interoception-based interventions in both high school and primary school settings, indicating the effectiveness of interventions for assisting students challenged with interoceptive and self-regulatory demands [9]. Specifically, analyses of interoception-based interventions, applied in high school settings in South Australia, indicate that at the high school level, interoception activity interventions have a very particular influence on reducing the rates of suspensions for students involved in the interventions [9]. The nature of the intervention was to embed interoception teaching into the year 8 and 9 classes and to enable the most dysregulated students to spend longer in specified interoception teaching classrooms. Accordingly, the students engaged in these specialised interoception teaching classrooms saw the most consistent decrease in recorded behaviour incidents over the year [9].

In addition, there was evidence for the effectiveness of the interoception teaching classroom for primary school students as well. However, in the primary school settings, there were some students who preferred to watch rather than engage in interoception activities [9]. This seems to have produced less stability in the impact of the intervention compared to high school students. However, even students who struggled to join in were able to benefit from observing the activities being a normal part of class and seeing their friends participate was useful in encouraging these students to participate in an interoception room, and eventually join in with their peers in class. In schools where there was an interoception room, many of the students who were initially identified as "probably needing to use the interoception space, but unlikely to go as they don't want to do anything that singles them out" did start to use the interoception rooms within 6–10 weeks of the room being freely available and accessed by all students in the school and not just particular groups of students with identified needs [9]. Overall, these analyses may provide evidence for interoception activities having a similar but different pattern of application in high schools compared to application in primary schools, where the analysis showed somewhat different results.

Emotional regulation has also been linked to prosocial peer engagement, which can be problematic for autistic people as social communication difficulties are a core diagnostic characteristic of autism [47]. Children on the autism spectrum typically have decreased self-regulation and are viewed as being less prosocial and emotionally and behaviourally engaged in school [60]. A relationship between self-control, wellbeing, and academic achievement has also been identified [60], with the finding that self-control is positively correlated with academic scores (GPA), conscientiousness, and emotional stability, and negatively correlated with the prevalence of eating disorders and psychological disorders. Thus, self-regulation is clearly vital to health and wellbeing and effective educational engagement, whereas poor self-regulation may lead to negative life outcomes.

4. Conclusions

Despite the current paucity of research examining the relationship between interoception and self-regulation, the connections they both have with homeostasis may help direct future research. Pathways which may be tested in future research are highlighted in Table 1. It is clear that effective interoceptive skills and self-regulation are essential to the healthy functioning of an individual both within themselves and more broadly within a community or educational context. Atypical or poorly developed interoceptive skills in these areas may contribute to and/or be impacted by psychological distress, as evidenced in trauma patients and psychological disorders [16,61]. Developmental psychology broadly and Attachment Theory more specifically have demonstrated that early childhood is an important period for the development of attachment and regulation, both of which rely on interoception. However, due to the neuroplasticity of the brain, interoceptive awareness and self-regulation skills can be taught, altering cortical connections in related areas to further develop resilience. The South Australian Department for Education's interoception

trials focused on the theoretical link between self-regulation and interoception and how these can be targeted early in a child's life in order to promote psychological, emotional, and physical health and wellbeing [9]. The trials offer promising insights into the positive effects of interoceptive skill development in children and the creation of more inclusive educational environments within which all children can thrive.

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