

**Psychomotor therapy in people with mild intellectual disabilities  
or borderline intellectual functioning:**

**What do you feel when you are angry?**

**Tina Bellemans**

## COLOFON

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**Psychomotor therapy in people with mild intellectual disabilities  
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What do you feel when you are angry?**

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# CHAPTER 1

## General introduction





## 1 Introduction

*Harry is a forty-two-year-old man diagnosed with a mild intellectual disability. He lives in a special care facility for individuals with intellectual disabilities. This morning he had one of his regular conflicts with his personal caregiver. He felt a sense of rising frustration when the caregiver made him an omelette instead of a fried egg. In addition, he felt as if he was being mocked by the other clients, which to him added insult to injury. At that point, Harry's breathing frequency had risen and his muscles had become increasingly tense, although he was not aware of it himself. He was flooded with emotions, and as a result he ended up throwing his plate towards his caregiver while hurling abuse at him. Behaviours like these, including shouting, swearing, threatening and fighting, are not unusual in the way Harry deals with difficult and ambiguous social situations. Still, such conflicts have a negative impact on his wellbeing, and since he is not allowed to go to work or go out as a consequence of his aggressive outbursts, Harry tends to get more and more socially isolated. In the past, he received cognitively oriented treatments for his aggressive behaviour, but these did not have the desired effect. It was concluded that Harry's problem was first and foremost related to his inability to cope with his anger. In general, having a short fuse and being unaware of rising tension and anger are reasons for referring a person to psychomotor therapy (PMT), a form of experiential treatment using movement and body experiences to decrease psychosocial and behavioural problems. In Harry's case, PMT was advised to address his problems with emotion regulation and aggressive behaviour: he could learn to help himself by becoming aware of feeling angry, by learning to regulate anger from a bodily starting point and by practising newly learned behaviour. It was therefore no surprise that Harry, in his own way and in his own words, came up with the following question for PMT: "How can I learn to regulate my increased tension, frustration and anger?"*

Harry's case illustrates the anger and aggression-related problems of many people with mild intellectual disabilities and borderline intellectual functioning (MID-BIF). Individuals with MID-BIF, characterized by significant limitations in both intellectual functioning (an IQ total score between 50 and 85) and adaptive skills, often present with aggressive behaviour (Bowring, Totsika, Hastings, Toogood, & Griffith, 2017). The prevalence of severe aggressive behaviour varies roughly between 10% to 20% across studies, mostly based on heterogeneous samples in terms of IQ scores and settings (Bowring et al., 2017; Tyrer, 2006). In an inpatient treatment setting for individuals with MID who demonstrate severe and challenging behaviour, the prevalence rate was as high as 50% (Tenneij & Koot, 2008). Aggressive behaviour, including both verbal and physical aggression, is thus a well-known problem in this target group. It has the potential to adversely affect not only the individual with MID-BIF but also his or her family and support staff. It may lead to isolation, stigmatisation, resource drain and mental health sequela (Hensel, Lunsy, & Dewa, 2014; Woods & Ashley, 2007).

Given the high prevalence and adverse consequences associated with aggression, it is not surprising that a great deal of research has focused on the cause and treatment of aggression in people with MID-BIF (e.g., Brosnan & Healy, 2011; Larkin, Jahoda, & MacMahon, 2013). For people with MID-BIF, there is some evidence showing the effects of cognitive behavioural therapy (CBT) techniques in treating anger or aggressive behaviour (cf. Ali, Hall, Blickwedel, & Hassiotis, 2015; Hamelin, Travis, & Sturmeijer, 2013): the behavioural components of CBT (e.g., role play) seem to contribute more to its effectiveness compared to components focused on cognitive distortions (Didden et al., 2016). A treatment with a strong focus on the "do-element" is psychomotor therapy (PMT). This treatment is widely integrated in the Dutch

and Flemish health care for people with intellectual disabilities (ID) (Emck & Scheffers, 2019). PMT has an experiential nature and includes movement exercises, emphasising body experiences and practising new and alternative (coping) behaviour in a safe and carefully designed therapeutic context. In PMT, the starting point is not characterized by talking about and reflecting on past events, but by experiencing and reflecting on what is happening here and now. In this therapeutic context, participants are given the opportunity to practise newly learned skills with repetitions in a variety of movement situations. PMT is seen as a suitable intervention for people with MID-BIF for two main reasons. It relies much less on participants' cognitive and verbal abilities than more cognitively oriented therapies (Kay, Clegg, Emck, & Standen, 2016), and it uses exercises in line with an experiential way of learning as suggested by Kolb (2015).

In the Dutch clinical practice for people with MID-BIF, deficient anger regulation and aggressive behaviour are the main reasons for referral to PMT (de Witte, Bellemans, Tukker, & van Hooren, 2016). However, and although PMT is often applied in clinical practice, there is little empirically based knowledge on the working mechanisms and the effectiveness of psychomotor interventions in this population. To address these matters, this research project focused on PMT techniques targeting deficient anger regulation and aggressive behaviour in individuals with MID-BIF.

## **2 Anger regulation: body signal attention and awareness**

Anger regulation refers to the process in which anger builds up and how this is experienced and expressed. A major factor here is the role played by the perception of internal body signals, as this can influence the way anger is experienced and expressed. In emotion regulation, both the attention to such internal processes and the awareness of one's emotional state are key elements (Füstös, Gramann, Herbert, & Pollatos, 2012; Price & Hooven, 2018). It is thus assumed that attention to body signals and awareness of these signals are important for knowing that one is angry and for regulating one's anger.

### **2.1 Interoceptive awareness**

The perception of internal body signals, including body signals related to internal organ function (such as heart rate, satiety and respiration) as well as those that are the effects of the emotion-related activity of the autonomic nervous system (such as transpiration, heart rate and muscle tension) is called interoception (Cameron, 2001). These body signals, or "somatic markers", are indispensable to emotions and for dealing with them. It is suggested by the "somatic marker hypothesis" formulated by Damasio (1994) that persons with a high level of accuracy in the perception of body signals experience emotions more intensely. More recently, interoception has been described as a multi-faceted construct consisting of interoceptive accuracy, interoceptive sensibility and interoceptive awareness (Garfinkel et al., 2015). In this dissertation interoceptive awareness (IA) is defined as the conscious awareness of interoception or the subjective evaluation of interoception.

Recently, the scientific interest in IA has grown. Studies on different topics of interest, such as obesity (e.g., Willem et al., 2019), alcohol or substance abuse (e.g., Jakubczyk et al., 2019) and depression (e.g., Van Beveren et al., 2019), have shown positive associations between IA and emotional regulation, as suggested earlier by Gross (1998). Gross argues that the way one perceives his or her internal body signals directly influences one's emotional experiences and thereby affects the process of emotional regulation. As such, IA is an important factor to consider when emotion regulation is deficient.

The scientific foundation of body-oriented interventions aimed at increasing IA as a tool to enhance emotion regulation in a diversity of populations is becoming stronger and stronger. For example, in individuals with substance abuse body-oriented interventions seem to have a positive effect on their awareness of body signals, emotion regulation and substance use (Price, Thompson, Crowell, & Pike, 2019; Price, Merrill, McCarty, Pike, & Tsui, 2020). In line with this evidence, interventions aimed at anger regulation might thus emphasise increasing IA (i.e., awareness of emotional and physical sensations). Learning to attend to these body signals may positively affect the cognitive control and decision-making processes that underlie patterns of aggressive behaviour. It is assumed that aggressive behaviour can be prevented when one recognizes anger and has the ability to cope with it in an adequate way (Zwets et al., 2016). Also in people with MID-BIF, deficient anger regulation is believed to increase the risk of aggressive behaviour. When one is unable to sufficiently regulate one's emotional response, disproportionately high physiological arousal due to anger may occur and may ultimately result in aggressive behaviour (de Looft et al., 2019; Novaco, 1994; Taylor, & Novaco, 2005). In light of this, IA might also be a concept of interest when trying to explain problems in anger regulation in people with MID-BIF. IA is thus of importance in the prevention and treatment of aggressive behaviour in this population.

In clinical practice, IA is mostly measured by means of interviews and/or questionnaires (self-reports). Physiological tests such as heartbeat detection tasks or heart rate (variability) tests are not suitable for measuring IA as these tests emphasise the accuracy or the intensity of the body signals themselves rather than the awareness of body signals. For measuring IA, several instruments are available. For example, the Porges Body Perception Questionnaire (Porges, 1993) is a measure for anxiety-related symptoms. The Multidimensional Assessment of Interoceptive Awareness (MAIA; Mehling et al., 2012; 2018) is a questionnaire developed for a more differentiated assessment of psychological aspects of the perception and evaluation of body sensations. The Anger Bodily Sensations Questionnaire (ABSQ) is available especially for anger-related IA (Zwets, Hornsveld, Kraaimaat, Kanters, Muris, & van Marle, 2014).

At the start of the current study, no research had been conducted on IA in adults with MID-BIF, and instruments to measure IA were not available for or adapted to this target group. If such a developed or adapted instrument for people with MID-BIF becomes available, the assumption that limited anger-related IA is an important factor in aggressive behaviours can be tested and treatments ameliorating IA can be evaluated.

### **3 Intermezzo: a (very) brief history of psychomotor therapy, with a focus on immediate experiences and awareness of the body and body signals**

PMT uses movement activities and focuses on bodily experiences as cornerstones in its approach. It is an umbrella term, comprising a large number of methods and techniques which originate in physical education and sports-based practice, relaxation therapy, body-oriented psychotherapy and martial arts-based interventions. The combination and integration of movement-oriented and body-oriented interventions derived from physical education (PE) led to the blend of interventions that constitute PMT as we know it today in Flanders and the Netherlands.

From a historical perspective, as described by De Lange (1998) and Probst & Bosscher (2001), PMT has evolved from "gymnastics" as a movement therapy for psychiatric patients in Flanders and the Netherlands that was first introduced in the early 19th century. In the mid-20th century, the first PE-teachers

worked in psychiatric institutions. Rijsdorp, who led the “Gymnology Institute” at the University of Utrecht where psychomotor therapists were taught since 1970, described the importance of the experiential perspective of movement in his seminal work (Rijsdorp, 1971). Another important figure is Kugel (1973), a lector at the PE-academy in The Hague, who was the first to mention body awareness associated with PE and movement interventions. The immediate experiences that are elected in a specific movement context, linked to awareness of the body and body signals, play a crucial role in PMT as currently applied - not only in mental health settings, but also in settings for people with intellectual disabilities.

#### **4 Psychomotor therapy targeting anger regulation problems and aggressive behaviour**

IA may be a concept of interest when trying to explain anger regulation problems in people with MID-BIF. Thus, it may be of significant importance in both the prevention and the treatment of aggressive behaviour in this population. As a result of its specific approach, PMT acts on body signals. Interventions can be focused on posture and the way one moves - elements that can be observed by others – as well as physical sensations (such as breathing, heartbeat and degree of muscle tension). These physical sensations can be described as body signals that can be used as a source of information. The main focus in this dissertation lies on the awareness of these body signals.

By repeated practice in carefully designed therapeutic situations that trigger emotions (especially anger and frustration), a person learns to develop the ability to attend to internal sensations. Due to increased anger-related IA, this results in an enhanced awareness of anger.

Besides making people aware of their body signals, PMT also uses the body as a tool for down-regulating anger. In response to their body sensations, people can be taught to use techniques (e.g., breathing exercises or relaxation exercises) to manage their anger. By focusing on and manipulating their breathing, heartbeat and muscle tension, anger and frustration decrease; as a result, aggressive behaviour can be prevented. By participating actively in PMT, participants learn to recognize their body signals and emotions, and they are confronted with their mostly automatic and often inappropriate behaviour (Emck, & Scheffers, 2019). In addition, alternative experiences can be created through a variety of PMT interventions which trigger the awareness of their bodily sensations, emotions and behaviour - automatic as well as newly learned behaviour (Emck, & Scheffers, 2019). The use of concrete and practical techniques has already been noted as being valuable for people with MID-BIF as this supports talking and thus relies to a lesser degree on the reflective abilities required in more cognitively oriented therapies (Lewis, Lewis & Davis, 2016).

PMT targeting anger regulation problems and aggressive behaviour has often been applied and investigated in several target groups (cf. Boerhout, van Busschbach, Wiersma, & Hoek, 2013; Zwets et al., 2016). In individuals with intellectual disabilities (especially in people with MID-BIF), PMT has often been applied in Dutch clinical practice to address aggressive behaviour caused by deficient anger regulation (de Witte et al., 2016). However, despite the clinical relevance, the (scientific) literature on this subject remains scarce.

## 5 Study aims

PMT has been shown to be effective for emotion regulation in different target groups. Despite the fact that PMT is a common type of treatment targeting anger regulation problems and aggressive behaviour in people with MID-BIF, only limited knowledge is available about PMT's contribution to IA in the light of anger regulation and aggressive behaviour in this population. PMT seems to be a well-suited intervention for this target group. However, at present there are three important factors that need to be addressed. First, there is little knowledge on the efficacy of PMT in the MID-BIF population. Second, insights gained from all perspectives, not only from an empirical viewpoint but also in terms of participants' experiences and insights obtained from psychomotor therapists, are very much needed in order to create a broad perspective on PMT targeting anger and aggressive behaviour in people with MID-BIF. Third, there is a clear need for an instrument to measure anger-related IA, adapted to the population, to evaluate the awareness of body signals related to anger in people with MID-BIF.

To explore the contribution of PMT to the decrease of anger regulation problems and aggressive behaviour in people with MID-BIF, the current study addresses the following research questions:

1. What is known about the effectiveness of body-oriented and movement-oriented PMT interventions for people with MID-BIF in terms of targeting anger and/or aggressive behaviour? (Chapter 2);
2. What are the experts' views on PMT as applied for targeting anger regulation problems and aggressive behaviour? (Chapter 3);
3. What are the experiences of clients who have received PMT for anger regulation problems and aggressive behaviour? (Chapter 4);
4. What are the psychometric characteristics of an adapted instrument to measure anger-related IA in people with MID-BIF? (Chapter 5).

## 6 Dissertation outline

For an overview of the current international state of affairs regarding the effectiveness of PMT for people with MID-BIF, we performed a systematic literature review. The results of this review address the first research question and are described in Chapter 2. To answer the second research question, we consulted seventeen psychomotor therapists working with people who were diagnosed with MID-BIF and who exhibit aggressive behaviour. In this study, we used an Intervention Mapping Approach to gain information on six topics: 1) a model of the problem, 2) objectives and outcomes of PMT, 3) theory-based and evidence-based methods and applications, 4) PMT programme development and production, 5) implementation plan and 6) evaluation plan. The results are presented in Chapter 3.

In addition, we performed a qualitative study to explore the perspectives of seven clients who received PMT treatment targeting anger regulation problems and aggressive behaviour. The results answer our third research question and are described in Chapter 4. Chapter 5 presents the results of a study on the psychometric properties of the Anger Bodily Sensations Interview- intellectual disabilities (ABS-I-id) in individuals with MID-BIF. This instrument is adapted from the Anger Bodily Sensations Questionnaire (ABSQ; Zwets et al., 2014). The chapter describes factor structure, internal consistency, test-retest reliability and convergent validity of this adapted instrument. The final chapter of this dissertation (Chapter 6) summarizes our studies' main findings. It discusses study limitations and concludes with suggestions for future research and implications for clinical practice.



## CHAPTER 2

# Psychomotor therapy targeting anger and aggressive behaviour in individuals with mild or borderline intellectual disabilities: a systematic review



Bellemans, T., Didden, R., van Busschbach, J. T., Hoek, P. T., Scheffers, M. W., Lang, R. B., & Lindsay, W. R. (2019).

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## **Abstract**

**Background:** Poor anger regulation is considered a risk factor of aggression in individuals with mild or borderline intellectual disabilities. Psychomotor Therapy (PMT) targets anger regulation through body- and movement-oriented interventions. This study aims to inform practitioners on efficacy and research-base of PMT in this population.

**Methods:** This systematic review evaluated nine studies which met inclusion criteria in terms of participants, intervention procedures, outcomes and certainty of evidence.

**Results:** Seven studies revealed a substantial reduction of aggressive behaviour or anger. Certainty of evidence was rated inconclusive in most cases due to absence of experimental control.

**Conclusion:** We can conclude that body-oriented PMT, involving progressive relaxation and meditation procedure “Soles of the Feet”, is a promising approach. However, the paucity of studies and methodological limitations preclude classifying it as an evidence-based practice. This suggests stronger methodological research and research aimed at PMT’s mechanisms of action (e.g., improved interoceptive awareness) is warranted.

## 1 Introduction

Estimates of the prevalence of aggression among individuals with intellectual disability, including those with mild or borderline intellectual disability (MBID), have reported that as many as 20% may engage in some form of aggression (Davies & Oliver, 2013; Lundqvist, 2013). Verbal and physical aggression are the most frequently reported typologies and are the leading cause for treatment referral in this population (Crotty, Doody, & Lyons, 2014). Both severe physical aggression that may result in bodily injury as well as milder forms of aggression (verbal threats) have the potential to adversely affect the individual with MBID, their family and support staff by leading to isolation, stigmatisation, resource drain and mental health sequela (Hensel, Lunskey, & Dewa, 2014; Woods & Ashley, 2007). Given the prevalence and range of adverse consequences associated with aggression, it is not surprising that a great deal of research has focused on the cause and treatment of aggression in people with MBID (e.g., Brosnan & Healy, 2011; Larkin, Jahoda, & MacMahon, 2013).

One potential factor suggested to contribute to the increased risk of aggressive behaviour in people with MBID involves deficient anger regulation or limited anger management skills. In the absence of the ability to sufficiently regulate one's own emotional response, relatively benign environmental stimuli may produce disproportional emotional arousal (i.e., undue anger) that may ultimately manifest in acts of aggression (Novaco, 1994; Taylor & Novaco, 2005). Successful anger regulation is hypothesised to require: (a) awareness of the social situations that may evoke the emotional state of "anger"; (b) the ability to identify body signals indicating a building anger (Mehling et al., 2012); and (c) a repertoire of coping skills to effectively and adaptively control anger and calm one's self before acts of aggression occur (Gratz & Roemer, 2004). This approach is similar to the Social Information Processing Model (see Larkin et al., 2013) focusing in particular on the arousal, physiological reactions or body signals related to anger in a given social situation.

Based on this model, treatment procedures for reducing aggressive behaviour in individuals with MBID have focused on improving anger regulation and teaching coping skills (see, e.g., Didden et al., 2016). Three specific types of coping skills have been considered, including: (a) physiological coping skills (e.g., relaxation or breathing exercises); (b) behavioural or socially mediated coping skills (e.g., seeking help); and (c) cognitive coping skills (e.g., problem-solving). For people without intellectual disability, cognitive behavioural therapy (CBT) techniques have been demonstrated to be effective at improving these abilities. Systematic reviews have concluded that there is some evidence supporting the effectiveness of CBT in treating anger or aggressive behaviour in individuals with MBID but note that many studies have methodological shortcomings (Ali, Hall, Blickwedel, & Hassiotis, 2015; Hamelin, Travis, & Sturme, 2013; Nicoll, Beail, & Saxon, 2013; Vereenoghe & Langdon, 2013). For individuals with intellectual or developmental disabilities, it has been suggested that the behavioural components of CBT (e.g., role play, prompting and reinforcing specific target behaviours) may contribute more to CBT's effectiveness than components focused on correcting faulty cognitive processes due to deficits in communication, abstract thinking and other skills associated with those diagnoses (Didden et al., 2016; Hamelin et al., 2013; Lang, Regeister, Lauderdale, Ashbaugh, & Haring, 2010; Nicoll et al., 2013). However, it remains difficult to establish the effectiveness of each separate component of CBT in the existing literature (Bhaumik, Gangadharan, Hiremath, & Russell, 2011). Therefore, for individuals with MBID and verbal or cognitive abilities that might constrain effective CBT, add-on approaches to target arousal reduction in a less verbal manner could be considered. For example, body-oriented techniques used in Psychomotor therapy

(PMT), including behavioural relaxation techniques (e.g., Progressive Relaxation or “Soles of the Feet”, a meditation procedure) to reduce arousal and support anger regulation might be feasible (Kay, Clegg, Emck, & Standen, 2016; McDonnell et al., 2015; Sturmey, Lindsay, Vause, & Neil, 2014).

PMT can be used as a complementary treatment for individuals with psychological or behavioural problems, in which a continuum of body-oriented techniques, such as Progressive Relaxation and deep breathing, to movement-oriented techniques, derived from sports and exercises, are allocated (Boerhout, van Busschbach, Wiersma, & Hoek, 2013; Probst, Knapen, Poot, & Vancampfort, 2010). These mainly non-verbal exercises are often guided by psychomotor therapists. Although PMT integrates a variety of approaches it emphasises awareness of bodily responses over awareness of emotion (Boerhout et al., 2013; Kay et al., 2016). The aim is to offer a context for participants to increase their interoceptive awareness (i.e., the ability to recognise differences in body signals). Within this therapeutic environment, participants are encouraged to practice with different forms of behaviour to help reduce excessive anger arousal and thereby preclude attempt to using aggression. In this way, CBT techniques and insight are given an extra context in which experiences and training with new forms of behaviour are part of the therapy sessions. Actively evoking here-and-now experiences is a basic principle in PMT (Boerhout et al., 2013; van der Maas et al., 2015; Röhrich, 2009; Zwets et al., 2016). PMT emphasises interoceptive awareness (being aware of changes in body signals) as opposed to placing emphasis awareness of the emotion of anger in an effort to enable individuals with MBID to reflect on the relationship between experiences and feelings (Kay et al., 2016).

Although the effects of PMT or specific body-oriented and movement-oriented interventions on the anger and aggression of individuals with MBID have been investigated in a number of studies, we are not aware of any existing review of that corpus of research. The purpose of this systematic review was to inform practitioners on the efficacy and the evidence-base of PMT by summarizing and analysing the participants, intervention procedures, outcomes and certainty of evidence (i.e., research rigour) of PMT studies involving the treatment of anger and aggressive behaviour in people with MBID. Second, we aimed to identify directions for future research that may contribute to ongoing efforts to treat aggression and reduce anger in people with MBID.

## **2 Methods**

A systematic analysis was conducted of studies that focused on PMT, namely body-oriented or movement-oriented interventions, to decrease anger or aggressive behaviour in individuals with MBID. Studies that met predetermined inclusion criteria were analysed and summarized in terms of: (a) participant characteristics; (b) dependent variables; (c) intervention procedures and dosages; (d) intervention outcomes; and (e) certainty of evidence.

### **2.1 Search Procedure**

A five-step systematic search procedure was used to identify studies for possible inclusion in this review. First, searches were conducted in five databases: PsychINFO, MEDLINE, CINAHL, ERIC and Web of Science. Search parameters were restricted to only yield peer-reviewed papers written in English that were published between 1980 and 2015. Search terms related to PMT (i.e., “dance and movement therapy”, “PMT”, “psychomotor physiotherapy”, “mind body intervention”, “movement oriented therapy”,

“body awareness therapy”, “body-oriented therapy”, “body psychotherapy”) as well terms associated with a broader collection of physiological interventions regularly used by psychomotor therapists (i.e., “exercise”, “physical activity”, “physical training”, “sport therapy”, “running therapy”, “physiotherapy”, “yoga”, “relaxation”, “mindfulness exercise” and “mindfulness-based stress reduction”) were paired with terms related to MBID (i.e., “mild intellectual disability”, “borderline intellectual disability”, “mild learning disability”, “mild mental retardation” and “borderline mental retardation”) and terms related to anger or aggressive behaviour (i.e., “anger”, “aggression” and “aggressive behaviour”). After eliminating duplicates, this combination of search terms across the five electronic databases resulted in 86 potentially eligible studies.

Second, the abstracts (and when necessary, the full texts) of the 86 articles were screened to identify studies that met the inclusion criteria (see inclusion and exclusion criteria). After the application of inclusion criteria, six studies were identified for inclusion. Third, the reference lists of those six studies were reviewed to identify additional studies for possible inclusion, and one additional study was identified for inclusion. Fourth, the surname of the first author of each of the included studies was entered as a search term in the five electronic databases to identify any other potentially eligible studies by the same authors. That process yielded two more studies for inclusion. Finally, in order to identify recent studies that had not yet been entered in databases, hand searches covering January 2015 – November 2015 were completed for the journals that had published two or more of the already included studies. However, no additional studies were identified. Ultimately, a total of nine studies were included as a result of this systematic multi-step search procedure that took place during October 2015 and November 2015.

## **2.2 Inclusion and Exclusion Criteria**

Studies were included if they met five inclusion criteria. First, the study had to be written in English. Second, the study had to be published between 1980 and November 2015. Third, the study included at least one participant with MBID (IQ 50–85). Fourth, the study had to focus on primarily a body-oriented or movement-oriented intervention (e.g., not a multicomponent anger management treatment package). And fifth, the study had to be an empirical study which evaluated the effectiveness of a movement-oriented or body-oriented intervention. If studies mentioned more than one procedure with different case studies in one paper, only the relevant cases with the PMT interventions were taken into consideration (e.g., Lindsay, Overend, Allan, Williams, & Black, 1998; Schloss, Smith, Santora, & Bryant, 1989). Previous reviews (e.g., Ali et al., 2015), theoretical papers (e.g., Young, 2012), intervention studies with a cognitive emphasis (e.g., mindfulness as cognitive intervention), and assessment-only studies (e.g., Willner, Brace, & Phillips, 2005) were excluded.

## **2.3 Data Extraction**

Each included study was coded for: (a) participant characteristics, (b) dependent variables, (c) intervention procedures and dosage, (d) intervention outcomes, and (e) certainty of evidence. Participant characteristics included gender, age, level of intellectual disability, comorbidity and a description of the setting where the participant lives. PMT interventions were described in terms of activities used, intervention session duration and frequency, and whether PMT was given in an individual or group format. The intervention's outcomes effect sizes were calculated as Percentage of Data Points Exceeding the Median (PEM; Ma, 2006); this is the percentage of data from the intervention phase below the median of data during baseline. In some cases, it was possible to calculate the mean PEM for a group of participants within a single-subject study.

This was done by first calculating the PEM for each participant individually and then calculating the mean of these percentages. The higher the PEM, the more effective the intervention is in terms of a reduction in aggressive behaviour or anger. If calculating PEM was not possible due to absence of individual information in group designs, the statistical findings as reported by the authors of the studies were summarised. PEM was selected over the percentage of non-overlapping data (PND) because PEM provides an indication of the effect size despite floor and ceiling points and is less sensitive to outliers in baseline compared to PND (Ma, 2006; Parker, Vannest, & Davis, 2011).

Certainty of evidence (or research rigour) was rated as “inconclusive” or “conclusive” (Millar, Light, & Schlosser, 2006) as a means to provide an overview of the quality of evidence (Schlosser & Sigafoos, 2007). This appraisal involved a two-stage process. First, studies lacking an experimental design with a follow-up period were classified as providing inconclusive results and studies with an experimental design (e.g., randomized controlled trial, multiple baseline or reversal design) were identified as having the potential to provide conclusive evidence. Second, experimental studies had to meet four additional standards to be classified as providing conclusive evidence: (a) a convincing demonstration of the intervention effect (PEM > 90% or a statistically significant decrease of anger or aggressive behaviour in group designs); (b) if relevant, there had to be interobserver agreement above 80%; (c) dependent and independent variables had to be operationally defined; and (d) a detailed description of the procedure was given to enable replication of the study.

#### **2.4 Reliability of Search Procedures and Interrater Agreement**

To ensure the accuracy of the five step systematic search, the first and fourth author independently proceeded through the multi-step search procedure and made an initial determination whether each study met the inclusion or exclusion criteria. Agreement on whether a study should be included or excluded was 90% (i.e., agreement was obtained on 9 of the 10 studies) with the study of Mullins and Christian (2001) included by one of two reviewers. After discussion between coauthors, the study was excluded because aggressive behaviour was not a target.

After agreement on studies, the first author extracted information to summarise the included studies. The accuracy of these summaries was independently checked by the fifth author, using a checklist that included the summary of the study and five questions regarding summary accuracy. The questions were: (a) Is this an accurate description of the participant(s)?, (b) Is this an accurate description of the focus of the intervention?, (c) Is this an accurate description of the intervention?, (d) Is this an accurate summary of the outcomes?, and (e) is this an accurate description of the certainty of evidence? The fifth author compared the summary with the original study and completed the checklist. If a summary was considered inaccurate, the fifth author edited the summary to improve its accuracy. The resulting summaries were then agreed upon and were used to create Table 1. This procedure was intended to ensure summary accuracy and to provide a measure of interrater agreement on data extraction and analysis. Agreement or disagreement was calculated on 45 items (i.e., five checklist questions x nine studies). In 37 items (82%) agreement was obtained at the first independent rating and final agreement after discussion was 100%.

### 3 Results

Table 1 provides an overview of the data extracted from each study.

#### 3.1 Participant Characteristics

In total, the nine studies presented data on 120 participants, aged 16–58 years. In eight studies, a total of 39 participants received intervention. In the study of Benson, Rice, and Miranti (1986) a range of participants (10–18) was provided and the exact number receiving intervention was not reported. Most participants were male ( $n = 84$ , 70%). Calculating mean age was not possible due to the lack of individual age data in several studies (i.e., Benson et al., 1986; McPhail & Chamove, 1989; Singh et al., 2013; To & Chan, 2000). In six studies all of the participants were diagnosed with MBID ( $n = 46$ , 38%) (i.e., Lindsay et al., 1998; Singh, Wahler, Adkins, Myers, & Mindfulness Research Group, 2003; Singh et al., 2008, 2011, 2013). In three studies there were also participants with a more severe level of ID included with those with MBID. DSM-IV-TR diagnoses were psychotic disorder NOS ( $n = 1$ ), bipolar disorder without psychotic features ( $n = 1$ ), impulse control disorder NOS and attention deficit hyperactivity disorder – combined type ( $n = 1$ ), paedophilia ( $n = 1$ ), and paraphilia NOS ( $n = 1$ ). Fifty-four participants (45%) were recruited from vocation training centres with no information about participant residences, 30 (25%) were living in a residential facility, 28 (23%) lived at home or with their parents, and 8 (7%) resided independently with visits from support staff.

#### 3.2 Dependent variables

Aggressive behaviour was targeted in six studies involving 62 (52%) participants (i.e., Lindsay et al., 1998; McPhail & Chamove, 1989; Singh et al., 2003, 2008, 2013; To & Chan, 2000). Verbal and physical aggression was measured by direct observation of operationally defined target behaviours in six studies, one study used only self-report and two studies combined observation with self-report. Anger was targeted in one study involving 1 (1%) participant (i.e., Schloss et al., 1989) and anger and aggressive behaviour were both targeted in two studies involving 57 (48%) participants (i.e., Benson et al., 1986; Singh et al., 2011). Anger was measured twice by observation of anger related body signals, of which one study combined it with self-report. One study only used self-reports. In two studies there were more dependent variables mentioned (total disruptive behaviour, motor disruptive behaviour and other disruptive behaviours, McPhail & Chamove, 1989; and incidents, selfcontrol, PRN medication, physical restraints, injuries, social integrated activities and physically integrated activities; Singh et al., 2003).

#### 3.3 Description of the Intervention

All intervention procedures used in the selected studies involved body-oriented interventions. No movement-oriented interventions were described. Progressive muscle relaxation (PMR) or the abbreviated variant, abbreviated progressive relaxation (APR), was utilised in five studies ( $n = 76$ , 63%) (i.e., Benson et al., 1986; Lindsay et al., 1998; McPhail & Chamove, 1989; Schloss et al., 1989; To & Chan, 2000). One of these studies combined PMR and systematic desensitisation (Schloss et al., 1989). Benson et al. (1986) compared four procedures: APR, self-instruction, problem-solving and anger management (including relaxation, self-instruction and problem-solving). One study described three individuals who were given different interventions, but only one case involved PMT and the other two cases were excluded from analysis (Lindsay et al., 1998). In the studies in which PMR or APR was used, the focus was on

**Table 1.** Studies that met predetermined inclusion criteria.

Authors	Participant Characteristics & Setting	pendent Variables and Design	Intervention Procedures	Intervention Outcomes	Certainty of Evidence
Benson et al. (1986)	N = 54, M = 32 y IQ range = 20-69 Vocational Centre	Anger Aggressive behaviour Comparing 4 interventions (pre, post, FU)	PMR, group or self-instruction, group or problem-solving, group or combined strategies, group	PMR resulted in significant reduction in aggressive behaviour, maintained at FU.	Inconclusive: no control condition
Lindsay et al. (1998)	N = 1, 58 y IQ range 50- 69 Living in service for ID	Aggressive behaviour AB-design with FU	APR, individual	Aggressive incidents dropped, during FU reduction of incidents was maintained. PEM = 95%.	Inconclusive: no experimental design
McPhail & Chamove (1989)	N = 10, M = 34 y IQ range = 20-69 Living at home	Aggressive behaviour RCT with active control (plus FU)	APR, group or story reading, group	Significant differences in aggressive behaviour in favour of APR-group. Aggressive behaviour returned to baseline during FU.	Inconclusive: low IOA
Schlösser et al. (1989)	N = 1, 26 y IQ ≥ 70 Living at home	Anger Multiple baseline across situations (including generalisation, FU)	PMR and systematic desensitization, individual	Reductions in anger responses. Maintained during generalisation and FU. Mean PEM = 98%.	Conclusive
Singh et al. (2003)	N = 1, 27 y IQ range = 50-69 Living at an institution	Aggressive behaviour AB-design with FU	Soles of the Feet, individual	Reductions in aggressive behaviour, maintained during FU. PEM = 100%.	Inconclusive: no experimental design
Singh et al. (2008)	N = 6, M = 29 y 1 IQ range = 50-69, 5 IQ ≥ 70 Forensic setting for individuals with ID	Aggressive behaviour Multiple baseline design (plus FU)	Soles of the Feet, individual	Reductions in aggressive behaviour. Mean PEM = 96%.	Conclusive
Singh et al. (2011)	N = 3, M = 30 y IQ range = 50-69 Living at home (2) or supported living (1)	Anger and Aggressive behaviour Multiple baseline design (plus FU)	Soles of the Feet, individual	Anger and aggressive behaviour reduced during intervention and effect was maintained during FU. Mean PEM anger = 88%. Mean PEM aggressive behaviour=55%.	Inconclusive: unconvincing effect

**Table 1. (Continued)**

Singh et al. (2013)	N = 17/17* M = 23/23 y IQ range = 50-69 Living with parents (8/5), supported living (9/12)	Aggressive behaviour RCT with waiting list control (plus FU)	Soles of the Feet, individual or waiting list, individual	Significant reduction in aggressive behaviour compared to control. Effect maintained during FU.	Conclusive
To & Chan (2000)	N =10, age range: 16 – 46 y IQ range = 40-70 Inpatient setting	Aggressive behaviour Pretest and posttest-design	APR, group	No significant reduction of aggressive behaviour.	Inconclusive: no experimental design, unconvincing effect

Note. *N*: number of participants; *M*: mean; *y*: years; *ID*: intellectual disability; *PMR*: progressive muscle relaxation; *APR*: abbreviated progressive relaxation; *RCT*: randomised control trial; *AB*: baseline intervention; *PEM*: percentage of data points exceeding the median; *FU*: follow up; *IOA*: inter observer agreement; \* experimental/control group

contracting and relaxing specific muscle groups, aimed at arousal reduction. The other four studies used the meditation procedure "Soles of the Feet" as intervention ( $n = 44$ , 37%) (i.e., Singh et al., 2003, 2008, 2011, 2013). The participants receiving "Soles of the Feet" were asked to think of a situation where anger was experienced after which they were asked to bring their attention to the soles of their feet, while holding on to the feeling of anger. The therapist mentioned anger related body signals (e.g., accelerated breathing). The participant's attention is shifted as they move their toes and concentrate on feeling the texture of the socks or the pressure of the shoes on the heel. The intent of this calming relaxation exercise is to predicate arousal reduction.

Intervention dosage varied a great deal across studies. Individual sessions ranged in duration from 15 to 90 minutes. Session frequency ranged from twice daily to once per week and the overall period of time from intervention onset to completion of data collection ranged between 5 days and 27 months. Some studies did not report complete information of intervention dosage (i.e., Lindsay et al., 1998; Schloss et al., 1989; Singh et al., 2008, 2011).

Three studies provided the original or the abbreviated PR-treatment in small groups, ranging from three to nine participants (i.e., Benson et al., 1986; McPhail & Chamove, 1989; To & Chan, 2000). The remainder of studies provided intervention in an individual format involving only one client and therapist at a time.

### **3.4 Intervention Outcomes**

In total, seven out of nine studies reported a substantial reduction in aggressive behaviour or anger. Six of eight studies focusing on aggressive behaviour reported a substantial reduction with PEM higher than 90% in three studies (Lindsay et al., 1998; Singh et al., 2003, 2008) and two studies demonstrated significant differences between the intervention group and control group (McPhail & Chamove, 1989; Singh et al., 2013). One study did not yield significant differences between treatment and control group solely focused on aggressive behaviour (To & Chan, 2000). The study by Benson et al. (1986) found a significant effect of PMR and other interventions on aggressive behaviour. Singh et al. (2011) failed at demonstrating a substantial reduction on both anger and aggressive behaviour in their study as PEM on anger was 88% and PEM on aggressive behaviour was 55%. One study focused solely on anger: Schloss et al. (1989) found a convincing reduction on anger (PEM > 90%).

Eight studies collected follow-up data and six of those studies included only individuals with MBID (Lindsay et al., 1998; Schloss et al., 1989; Singh et al., 2003, 2008, 2011, 2013). For the 29 participants with follow-up data, all studies with FU period except for two, the reduction of aggressive behaviour or anger was reported as maintained from three to 24 months. In the study of Singh et al. (2011), the initial positive effect on anger was not maintained at 24 months' follow-up. Benson et al. (1986) and McPhail and Chamove (1989) included participants with varying levels of ID. The initial reduction in aggressive behaviour was maintained at four to five week follow-up in the study by Benson et al. (1986) but was not maintained at 12 week follow-up in the study by McPhail and Chamove (1989). Follow-up data specific to participants with MBID in those studies could not be disaggregated.

### **3.5 Certainty of Evidence**

Most studies used single-subject research designs but that group included studies utilising AB-designs not capable of demonstrating experimental control (Lindsay et al., 1998; Singh et al., 2003). Three studies using multiple baseline designs met the experimental design criterion (Schloss et al., 1989; Singh et al., 2008,

2011). There were also four group designs included. One study had a non-experimental group design, namely a pretest posttest-design (To & Chan, 2000) and the study by Benson et al. (1986) compared four active interventions without a control condition. Two studies were Randomised Clinical Trials (RCT), one with an active control group (McPhail & Chamove, 1989) and one with a waiting list control group (Singh et al., 2013). The certainty of evidence was rated as conclusive for two out of eight reviewed studies on aggressive behaviour (i.e., Singh et al., 2008, 2013) and one out of three reviewed studies on anger (Schloss et al., 1989). Four studies were rated as inconclusive because of a lack of experimental control (Benson et al., 1986; Lindsay et al., 1998; Singh et al., 2003; To & Chan, 2000), although three of these studies suggested an effect of PMT on aggressive behaviour (Benson et al., 1986; Lindsay et al., 1998; Singh et al., 2003). One study was rated inconclusive due to low interrater agreement (McPhail & Chamove, 1989). One study was rated as inconclusive due to non-significant results on aggressive behaviour or anger (Singh et al., 2011).

## 4 Discussion

This systematic review evaluated the effectiveness of body-oriented PMT interventions (no movement-oriented studies met inclusion criteria) for reducing anger and aggressive behaviour in individuals with MBID. The PMT body-oriented intervention components, as used in the studies that met the inclusion criteria, include PMR and the meditation procedure “Soles of the Feet”. Most studies reported an intervention effect on anger or aggressive behaviour, but these results need to be interpreted with caution due to overall lack of research rigour. For all but three studies certainty of evidence was rated as inconclusive, mostly due to a lack of experimental control. Based on the criteria for identification of empirically supported therapies of Nathan and Gorman (1998), Roth and Fonagy (1996) and Spirito (1999) (as cited in Chambless & Ollendick, 2001) we can conclude that PMT is a promising treatment for anger and aggressive behaviour in individuals with MBID. However, the research-base in this area does not yet meet commonly accepted definitions of evidence-based practice (e.g., Sturmey & Didden, 2014). Future research involving studies with a stronger methodological character aimed at identifying PMT’s mechanisms of action (e.g., improved interoceptive awareness) appears warranted.

The absence of movement-oriented intervention components in the corpus of research is surprising given that fitness and exercise-based interventions have been demonstrated to be effective in the treatment of aggressive behaviour in individuals with more severe ID (Ogg-Groenendaal, Hermans, & Claessens, 2014) and individuals with pervasive developmental disabilities (Lang, Koegel, et al., 2010). Future research involving movement-oriented PMT intervention components either in isolation or in combination with body-oriented components may be fruitful.

The mechanism of action posited to underlie body-oriented PMT depends on the reduction of anger or on preventing the emergence of an angry emotional state and on the augmentation of coping skills in order to reduce anger emergence. The assumed mechanisms of action of PMT targeting anger and aggressive behaviour in individuals with MBID therefore involve anger related IA and coping skills. This is in line with the assumption that anger has to be experienced (by anger related IA) and that efficient coping skills should be used in case the participant experiences anger (Gratz & Roemer, 2004; Mehling et al., 2012). As for the first assumed working mechanism, it is not clear whether PMT, using body-oriented interventions, should focus specifically on anger-related IA, IA in general or on some other mechanism not

yet recognised in the PMT research-base. The included studies on PMR emphasise only on IA in general (e.g., feeling the difference between tension and relaxation in your muscle). In the meditation procedure the focus is on general IA, especially tactile information, as well as on anger-related IA (e.g., what do you feel in your body when you are angry); however, this is not accentuated during the exercises. As individuals with MBID often have problems with generalization and transfer to daily life, one could assume that it is helpful to focus on anger-related IA to prevent becoming aggressive. This could help them to focus on relevant information to recognise their emotion. Focusing on relevant information, which is often a problem in individuals with MBID, facilitates transfer and generalization (Alberto & Troutmen, 2003). Second, coping skills are assumed to be part of the mechanism of action responsible for improvements and were taught in all of the included studies. In PMR the focus is on relaxation as a coping skill to reduce arousal and in the meditation procedure attention on tactile perception is taught as a coping skill. In this case, IA is used to focus the attention on a neutral point of the body as to down regulate arousal. Future research on the mechanisms of action of PMT is warranted.

In this review three studies stated that anger was focused on during intervention. Only one study was considered as providing conclusive evidence (Schloss et al., 1989), in one study the reduction of anger resulted in a PEM of 88%, falling slightly short of the 90% or better PEM criteria (Singh et al., 2011). Therefore, the mechanism of action thought responsible for the beneficial effects of this class of interventions cannot be confirmed with this population and a number of alternative explanations for the benefits of PMT remain possible. Further, the extent to which these procedures actually result in a beneficial reduction of anger has not been sufficiently demonstrated. Future research towards identifying more direct and accurate ways to assess anger in people with MBID and then towards elucidation of the mechanism of action for PMT is needed. In the included studies anger was measured by focusing on anger body signals by observation of movements and facial expression (Benson et al., 1986; Schloss et al., 1989) and self-reports (Benson et al., 1986; Singh et al., 2011). In terms of more accurate measurement, physiological correlates of anger, such as increased heart rate or respiration and possibly cortisol levels are worthy of further research consideration. In the existing research, only one study provides information on the awareness of anger-related body signals (e.g., furrowed brows or increased heart rate) in order to recognise anger (Singh et al., 2011). A more thorough understanding of the variables that underlie effective intervention approaches achieved through more accurate measurement of the key constructs could lead to the modification of the intervention (or creation of a novel approach) that is more efficient or effective.

Because certainty of evidence of the majority of studies is rated as inconclusive mostly due to absence of experimental control, this review does not yet support the use of these procedures in contexts where research based or evidence-based practices are mandated. However, in cases where existing evidence-based practices (e.g., function-based operant interventions) have failed to yield desired outcomes or when research indicates that an individual's characteristics are not well suited for a treatment approach tailored for a different population (e.g., when CBT is precluded by an individual's verbal or cognitive deficits), PMT may be considered a potential treatment option (McDonnell et al., 2015; Reynolds & Field, 2013). Because PMT is primarily a nonverbal approach for teaching skills that can be used across environments and social situations it may be best used as a complementary therapy to augment other approaches such as CBT and function-based behavioural intervention (Probst et al., 2010). PMT is consistent with previous research suggesting that efforts to reduce aggression in individuals with MBID should aim to teach people self-management skills, functional skills, emotional regulation skills and problem-solving skills (Didden et al., 2016). Future research could aim to evaluate the effect of PMT in individuals with MBID as

complementary therapy compared to treatment as usual, similar to the study on aggression regulation in patients with eating disorder (Boerhout, Swart, van Busschbach, & Hoek, 2016) and the study in chronic pain revalidation in individuals without MBID (van der Maas et al., 2015).

This systematic review has several limitations. To minimise bias, multiple databases were searched and hand searches were conducted. Although this search was systematic and involved predefined inclusion criteria, the possibility of publication bias remains.

It has been noted in previous research that studies reporting significant positive results are more likely to be published (Sutton, 2009). Therefore, reviews aimed at identifying evidence-based practices that include only peer-reviewed published studies may also be affected by this publication bias. An effective systematic review or meta-analysis should stimulate replication and extension studies on those interventions (see, e.g., Francis, 2012). Therefore, when a limited number of studies are identified for inclusion in a review, it is unclear whether this is because few researchers have investigated the topic or if there has been substantial research but that the findings of those studies were inconclusive or nonsignificant.

This review identified a larger number of studies focused on body-oriented interventions (particularly progressive relaxation and “Soles of the Feet”) and a lack of articles on movement-oriented interventions. Therefore, it is not possible to determine if (a) movement oriented interventions are rarely used in clinical practice; (b) these interventions are used clinically but no effort is made to study results; or (c) research has been conducted but was not published due to ambiguous or negative results. We conclude that the lack of data on other body- and movement-oriented interventions does not necessarily mean those interventions are ineffective or unworthy of future research.

Two different ways of reporting the effectiveness of the interventions were applied (i.e., significant differences in group studies and PEM in case-studies) and a direct comparison of these results across studies is not possible in light of these differences. However, given that the results from both single-case design and group design studies were similarly mixed and the conclusion reached by the review was conservative (i.e., PMT was not identified as an evidence-based practice), the limitation is minor.

In this review both individuals with mild intellectual disability (IQ 50–69) and borderline intellectual functioning (IQ 70–85) are included. This is in accordance with how treatment is organised in the Netherlands and Belgium. So this review did not itemise these two groups as would the case in, for example, the UK and US. It should be noted that in the present review most participants had a mild intellectual disability (see Table 1).

Despite these limitations, the results of this review provide a note of caution to practitioners interested in PMT and suggests its use be limited to cases that fail to respond to evidence-based interventions or as a supplement to evidence-based intervention packages. Additionally, the findings of this review suggest progressive relaxation and “Soles of the Feet” meditation may have a positive effect but the potential benefit of other body-oriented and movement interventions remains unclear. Future research towards providing a stronger demonstration of benefit (i.e., increased certainty of evidence); better understanding of mechanisms of action; improved measurement approaches for target variables (e.g., anger) and expanding PMT components to include body-movement strategies utilised with other populations appears necessary.



## CHAPTER 3

### Psychomotor therapy for anger aggression in mild intellectual disability or borderline intellectual functioning: an intervention mapping approach



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## **Abstract**

Difficulties with anger regulation in individuals with mild intellectual disability or borderline intellectual functioning (MID-BIF) are often associated with aggressive behaviour. Psychomotor therapy (PMT), a mind-body intervention often applied in Dutch facilities for this target group, uses body awareness and physical activities as a medium to learn how to gain control over one's anger and reduce aggressive behaviour. With Intervention Mapping as a framework, 17 Dutch psychomotor therapists were asked to describe their PMT programme to investigate its content and coherence. Results suggested that interoceptive awareness (IA) and adaptive coping skills (ACS) are key elements of the PMT programmes. The theoretical basis of the PMT programmes is however limited and specific instruments for evaluating PMT are not available yet, especially for IA. Psychomotor therapists would gain from a well-described PMT programme. Future research is warranted on IA, and specific instruments need to be developed and validated for this target group.

## 1 Introduction

Psychomotor therapy (PMT), an experiential therapy, is defined as a treatment that uses body awareness and physical activities as cornerstones of its approach. It is based on a holistic view, which integrates cognitive, emotional and motor aspects of an individual's functioning (Probst, Knapen, Poot, & Vancampfort, 2010). PMT aims to offer 'a playground' for participants to increase their ability to recognise differences in one's own body signals, i.e. 'interoceptive awareness' (IA), and practice with different forms of responding. Through actively participating in exercises, awareness of body signals, emotions and thoughts increases and there is growing recognition of one's own behavioural reactions (see Boerhout, Swart, van Busschbach, & Hoek, 2016; Röhrich, 2009; van der Maas et al., 2015; Zwets et al., 2016). PMT is well embedded in health care in Europe although the term PMT is not an established term in the English literature. Other terms like Body-oriented Psychotherapy or Dance and Movement Therapy are more commonly used (Probst et al., 2010).

PMT seems to be effective in individuals who experience anger or present with aggressive behaviour (Boerhout et al., 2016; Zwets et al., 2016). In individuals with limited cognitive and verbal abilities aggressive behaviour often occurs, with anger as a potential risk factor (Novaco, 1994; Taylor & Novaco, 2005). Due to the experiential nature of PMT that relies less on clients' verbal skills, PMT seems feasible as a treatment for individuals with limited cognitive and verbal abilities such as individuals with mild intellectual disabilities (MID, IQ 50–70) or borderline intellectual functioning (BIF, IQ 70–85) (Kay, Clegg, Emck, & Standen, 2016; McDonnell et al., 2015). As these two groups share many characteristics and needs (namely, deficits in cognitive and adaptive functioning and psychosocial problems), they are merged in both scientific literature and Dutch clinical practice. Therefore, this group is defined as MID-BIF (Wieland & Zitman, 2015).

A systematic review demonstrated that, based on the criteria of empirically supported therapies (see Chambless & Ollendick, 2001), PMT is a promising approach in individuals with MID-BIF showing aggressive behaviour (Bellemans et al., 2017). However, the review suggested that the evidence around PMT currently lacks clarity regarding the process, mechanisms of action, and target outcomes.

The absence of a standardised programme targeting aggressive behaviour as the main problem, with explicit objectives and outcomes, necessary in the context of a transition from practise-based interventions to evidence-based practise, is not uncommon in this field. Although there is a growing interest in evidence-based interventions for individuals with intellectual disabilities scientific research has traditionally been ignored (see e.g. Sturmey & Didden, 2014). Furthermore, practice-based interventions, such as PMT, or even interventions that have been demonstrated to be ineffective, are frequently applied in clinical practice with this population (Goin-Kochel, Mackintosh, & Myers, 2009; Goin-Kochel, Myers, & Mackintosh, 2007). To improve the quality of care, individual clinical expertise needs to be integrated with the best available evidence from systematic research (Singh, 2016).

Intervention Mapping has been proposed as a way to systematically develop and/or evaluate theory- and evidence-based programmes (Eldredge et al., 2016; Kok, Bartholomew, Parcel, Gottlieb, & Fernández, 2014). Intervention Mapping is a six-step framework that integrates evidence from existing research with clinical practice to develop a coherent programme.

In the first step, called logic model of the problem, the problem which is targeted in the programme, is described. In the second step, called logic model of change, the expected and measurable outcomes of the programme are expressed. Programme design, the third step, identifies intervention methods to

achieve the outcomes identified in step 2. The rationale for the method selection needs to be based on clear theoretical links between the method and the problem (step 1) as well as existing evidence, i.e. intervention methods that have been shown to produce change. In programme production, the fourth step, the problems, programme outcomes and methods found in the first three steps are brought together to design a coherent intervention programme.

Implementation plan, the fifth step, determines the scaling-up of the programme, and how to sustain implementation in real-life contexts. At this stage, it is crucial to involving both policy makers and practitioners. In the final step, evaluation of the programme, an evaluation plan is made to test whether the expected outcomes, mentioned in the second step, are achieved by the programme (i.e. outcome evaluation) as well as a plan for the evaluation of the programme's process (i.e. process evaluation). Completion of these six iterative steps results in a template for implementing and evaluating a programme whose design has integrated theoretical, empirical and practical information.

In the present study we used Intervention Mapping to gather detailed information on the PMT programmes that are currently applied when individuals with MID-BIF have problems managing their own anger and aggressive behaviour. The aim of this study was to describe the theoretical orientation, process content, implementation and evaluation of PMT programmes as used by psychomotor therapists in facilities for individuals with MID-BIF and anger regulation problems or aggressive behaviour. We interviewed 17 psychomotor therapists on how they currently apply PMT, its objectives and outcomes, perceived mechanisms of action, theoretical background, and evaluation. Similar to the method followed by Schaafsma and colleagues (2013) we asked multiple questions per step. The six steps of Intervention Mapping were thus used as a post hoc framework to map the programmes' content as well as their coherence. It was anticipated that interviews would increase our understanding of the way PMT programmes are used in practice, while the Intervention Mapping framework would enable a systematic description of their application and evaluation methods. Developing a standardised PMT programme can be used to study the effectiveness of PMT as an intervention for aggressive behaviour or anger regulation difficulties in individuals with MID-BIF.

## **2 Methods**

### **2.1 Participants**

For this study, a pre-selected sample of psychomotor therapists who are members of the Dutch Association for PMT [NVPMT; Nederlandse Vereniging voor Psychomotorische Therapie] and who on earlier occasions had expressed an interest in participating in research, were contacted to fill in the questionnaire. Therapists had to have at least three years' experience in the treatment of anger management problems and/or aggressive behaviour with individuals with MID-BIF. In addition, participants were considered only if they had been educated on psychomotor therapy at Master's level, to ensure that they were able to reflect on the intervention and its underlying mechanisms of action. Thirty-six psychomotor therapists were approached individually by e-mail. Thirteen psychomotor therapists did not meet the criteria for inclusion due to the absence of a Master's degree ( $n = 12$ ) or only one year of experience with this target group ( $n = 1$ ). Twenty-three therapists met the inclusion criteria. Of those, six did not complete the questionnaire. Seventeen psychomotor therapists (4 males, 13 females) were included in the final analyses. All of them work with individuals with MID-BIF in both inpatient and outpatient settings.

## 2.2 Procedure and Questionnaire Topics

An online questionnaire, Qualtrics (selection 12.4) [software] (2016), was used to gather information on six topics similar to the steps of the Intervention Mapping (Eldredge et al., 2016). The third author formulated the questions per topic (see Table 1) in line with an earlier adaptation of the Intervention Mapping approach by Schaafsma, Stoffelen, Kok, and Curfs (2013) and these were discussed and adapted by five experts (one on Intervention Mapping, one on PMT, and three on PMT as applied in ID-facilities).

The psychomotor therapists were informed about the content of the Intervention Mapping approach together with an invitation to participate as they were not familiar with this approach. This gave them the opportunity to prepare in advance, by considering what they do, why they do this, which outcomes they want to achieve and how their PMT-programme is evaluated.

**Table 1.** Intervention Mapping process: adaptation for the interviews on PMT-programmes targeting aggressive behaviour / anger regulation in MID-BIF.

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Step 1: Logic model of the problem
<ul style="list-style-type: none"><li>• Which percentage of the caseload of PMT targets aggressive behaviour / anger regulation?</li><li>• Give a description of the problem or problem behaviour.</li><li>• Which factors influence the problem?</li><li>• Give a description of the target group of the PMT-programme.</li></ul>
Step 2: Logic model of change
<ul style="list-style-type: none"><li>• Which elements (in the participant and in the environment) need to be changed in order to improve emotion regulation?</li><li>• Are the changes formulated in terms of outcomes? Which outcomes (on knowledge, attitudes, emotions, skills and behaviour)?</li><li>• Are changeable factors taken into account, while formulating the outcomes?</li></ul>
Step 3: Programme design
<ul style="list-style-type: none"><li>• Which theoretical framework is used? Why?</li><li>• Which methods and strategies are used? Why?</li><li>• Which practical applications are used? Why?</li></ul>
Step 4: Programme production
<ul style="list-style-type: none"><li>• Are members of the target group or experts consulted about the design of the programme? When?</li><li>• Are the outcomes incorporated in the PMT-intervention? How?</li><li>• Are the activities tested before implementation?</li></ul>
Step 5: Implementation plan
<ul style="list-style-type: none"><li>• Are the PMT-implementers and implementation decision makers involved?</li><li>• Are potential barriers identified and taken into account (e.g. policy, motivation, planning in participants and policy in organization)?</li></ul>
Step 6: Evaluation Plan
<ul style="list-style-type: none"><li>• Is the PMT-programme evaluated (on process and product)?</li><li>• Which instruments are used?</li></ul>

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## 2.3 Data Processing and Analysis

Quantitative data and data of multiple-choice questions were directly analysed in Qualtrics (version 12.4) [software] (2016). All qualitative data were imported in ATLAS.ti (version 7) [software] (2016) for analysis. For each question answers were categorised per topic code (derived from the steps of the Intervention Mapping) by the third author (RV) and the categories were validated by the first author (TB). When discrepancies occurred between the two researchers, the categories were discussed until agreement was reached. Following this, the answers linked to the categories were sent to the psychomotor therapists

who could check the answers on correctness and completeness. When needed, additional information was specifically asked for. After receiving feedback from the therapists, the procedure of categorisation, validation and consensus was repeated for the feedback. At the end of this process, a list of categories was developed for each step of the Intervention Mapping, separately for every therapist. This list was once again sent to the psychomotor therapists for a check on correctness and completeness. The feedback provided by the therapist was used to review the list, and a final list of categories with answers was created. The information from all psychomotor therapists was then amalgamated. The amalgamation of data from therapists resulted in multiple categories being available under every step of the Intervention Mapping.

### 3 Results

Findings are presented in two sections. First, we provide an overview of the applied PMT programmes, and the various steps of the Intervention Mapping. Second, we focus on the common thread that emerged through the steps to provide a comprehensive description of PMT programmes.

#### 3.1 Overview of the programmes

##### *Step 1: Logic model of the problem*

Therapists perceived that anger and/or behaviour problems in their clients were associated with limitations in interoceptive awareness (IA; i.e. poor recognition and awareness of one's body signals) and limitations in adaptive coping skills (ACS); see Table 2.

Therapists were asked whether anger and/or aggressive behaviour were the main reasons for referral for PTM. Only one therapist indicated that this is the case for a minority of his cases (40%). For all other therapists more than half of their clients presented these problems (50–70% of their caseload;  $n = 10$ ), while for six this was the most common reason for client referral (80–90% of their caseload). A lack of self-confidence ( $n = 10$ ) and resilience ( $n = 9$ ) are frequently (related) problems in individuals with MID-BIF that are grounds for referral to PMT.

**Table 2.** Factors leading to anger and aggressive behaviour in MID-BIF that are targeted in PMT-programmes

General factor	<i>n</i>	Specification	<i>n</i>
Limited IA	17	Limited anger related IA	11
		Limited overall IA	6
Limited ACS	17	Rigid coping style, unable to change focus on other behaviour	17
		Unable to reduce arousal	8
		Inadequate coping skills in social situations	17

Note. *n* = number of psychomotor therapists that mentioned these factors.

##### *Step 2: Logic model of change*

The most frequently mentioned PMT objective was improving ACS. This included improving focusing on other or alternative behaviours (e.g. listening to music, stepping out of the situation), (physiological) arousal

reduction through exercises (e.g. relaxation, breathing exercises), and improving ACS in social contexts (e.g. help seeking) when feeling angry or aroused. Another frequently mentioned goal in PMT is increasing IA. Overall IA (recognition and awareness of body signals not related to a specific emotion, which can be described as a perception of body signals) and/or anger related IA (recognition and awareness of body signals when angry, which is an interpretation of body signals) were mentioned as two specific components of IA (Table 3).

While in PMT programmes improving IA and ACS are the main objectives, other interventions have a strong focus on the external triggers leading to aggressive behaviour (e.g. cognitive behaviour therapy). The psychomotor therapists who were interviewed stated that, although working on these external triggers is important and should be part of the multidisciplinary approach, it is not a specific objective of PMT as they apply it (Table 3).

**Table 3.** Objectives of PMT-programmes targeted at anger and aggressive behaviour in MID-BIF.

Objectives of programmes	<i>n</i>	Specified PMT programme outcomes	<i>n</i>
Increasing IA	12	Increased IA with to anger related bodily signals	6
		Increase overall IA	11
Improving ACS	16	Better coping through focusing on other behaviour	13
		Better arousal reduction	8
		Increased social skills	7
Recognising external triggers	5		
No answer	1		

Note. *n* = number of psychomotor therapists who mention one or more (sub) objectives.

### *Step 3: Programme design*

Mechanisms of action of the PMT programme are explored in the third step of the Intervention Mapping. This step is divided in two sub steps. In the first sub step (step 3a), questions were asked about the theories / models linked to practical applications, whereas information on the methods linked to practical applications were asked in sub step 3b. Interviewees found this step challenging. In contrast to the information provided in the first two steps, several rounds of feedback and enquiry were needed to get the full picture of the theoretical base or models used.

#### *Step 3a: Programme design*

Therapists mostly identified two major theoretical models underlying PMT for anger and aggressive behaviour in individuals with MID-BIF. Firstly, they referred to the model underlying cognitive behavioural therapy (CBT) that integrates traditional behavioural theories focussing on reinforcement mechanisms, social learning theory that adds observation as a key to learning and cognitive theory. Secondly, they referred to the General Aggression Model (GAM) as proposed by Anderson and Bushman (2002). GAM places similar emphasis on the environment and cognitions to account for learning processes. Two therapists reported that their frame of reference is the so-called Biopsychosocial Model as proposed

by Engel (1980) who emphasised that behaviour and illness are affected by biological, psychological and sociological factors. In this model, the client's subjective experience is seen as essential and contributing to accurate diagnosis, health outcomes, and humane care (Borrell-Carrió, Suchman, & Epstein, 2004). One therapist mentioned the humanistic theory, especially with emphasis on the unconditional positive regard (a concept developed by Rogers; Wilkins, 2000).

The psychomotor therapists justified their choice of these theories and models by indicating these were proposed by literature and expert opinion. However, it should be mentioned that two psychomotor therapists indicated they did not use a theoretical model, rather were guided by their own clinical experience for the development and evaluation of their PMT programme.

#### *Step 3b: Programme design*

Two PMT categories, namely action-oriented PMT and experience-oriented PMT, were used by the therapists (Probst et al., 2010). Action-oriented PMT focuses on learning by repeating or automatising skills, whereas experience-oriented PMT focuses more on insight into emotions and the way of responding (caused by their emotional state). For this reason, experience-oriented PMT was used to improve IA, whereas action-oriented PMT was applied to increase the repertoire of ACS. The use of action-oriented and experience-oriented PMT was supported by the psychomotor therapists as PMT reflects the concrete learning style of individuals with MID-BIF and it is less dependent on their cognitive and verbal abilities.

The psychomotor therapists mentioned other methods: positive reinforcement and modelling. Furthermore, five psychomotor therapists noted that treatment involved working through the client's relapse prevention plan, practising and evaluating stressful situations and ways of coping.

Several practical PMT applications (activities as applied in PMT) were mentioned: (a) activities that emphasised IA, such as using tools to visualise tension (for example a tension thermometer) and/or general exercises focusing on IA; (b) activities that aimed to improve ACS, such as arousal reduction techniques (e.g. progressive relaxation, applied relaxation and breathing exercises), focusing on other behaviour (e.g. stepping out of the situation), or activities that help practising new behaviour in social contexts (e.g. role plays). Also the connection between IA and ACS in activities was mentioned emphatically by several psychomotor therapists (such as by focusing on body signals while being challenged during a basketball exercise or home assignments focusing on reducing arousal when feeling tensed).

#### *Step 4: Programme production*

The PMT-programmes as described by the psychomotor therapists were embedded in a multidisciplinary treatment, as a complementary programme for anger regulation problems or aggressive behaviour. Fifteen psychomotor therapists suggested that they involved other people in the development of their PMT-programme. Table 4 shows the categories of other people as described by participants for each part of programme production.

**Table 4.** Involvement of other professionals during PMT programme production

Other professionals	<i>n</i>	Phase	<i>n</i>
Other psychomotor therapists	12	Total process	4
		One or more distinctive parts of the process	7
		Outcome description	7
		Formulating purposes of application according to outcomes	6
		Problem analysis	4
		Linking theories/ models, strategies to the practical applications	4
		Implementation	3
		Other experts*	11
Other experts*	11	One or more distinctive parts of the process	5
		Programme production	5
		Outcome description	2
Clients of the target group	6	Total process	0
		One or more distinctive parts of the process	6
		Programme production	3
		Evaluation	3
		Setting preconditions of PMT	1

Note: \* psychologists, clinicians, other experiential therapists (such as music therapists or drama therapists); *n* = number of psychomotor therapists who mentioned the involvement of others

### *Step 5: Implementation plan*

Few psychomotor therapists (*n* = 3) indicated they had direct responsibility for the implementation of the PMT-programme. All three mentioned limited time as the most important barrier for the implementation of a new programme. Half of the psychomotor therapists reported that it would be helpful to involve therapists from other disciplines, namely referrers (*n* = 8) and other experiential therapists (e.g. music therapy) (*n* = 3), in the context of referring to PMT.

Two psychomotor therapists invited people from the personal network of the client with MID-BIF (e.g. siblings or parents) to participate in a part of the PMT-programme. Where psychomotor therapists indicated that others (e.g. PMT-colleagues, staff or siblings) had been involved in delivering part of the PMT programme, it was also suggested that a manual of the programme was available (*n* = 5).

### *Step 6: Evaluation plan*

#### *Step 6a: Product evaluation*

Most psychomotor therapists suggested using an unstructured approach to outcome evaluation. This evaluation was mostly based on the views of the client and carers (e.g. parents) (*n* = 7) and/or on the views of the referrer (*n* = 3) regarding change in aggressive behaviour or ACS.

One interviewee did not answer this question. Only two psychomotor therapists described using specific outcome measures for IA (ABSQ; Anger Bodily Sensation Questionnaire, Zwets et al., 2014; or based on a self-constructed heart beat awareness test) or ACS (e.g. UCL; Utrecht Coping List [Utrechtse Coping Lijst], Schreurs, van de Willige, Brosschot, Tellegen, & Graus, 1993). These two psychomotor therapists indicated that the instruments had not yet been validated in this population. Table 5 presents participants' responses on the product evaluation of PMT targeting anger and aggressive behaviour in individuals with MID-BIF.

**Table 5.** Product evaluation of PMT mentioned by the therapists

Aggressive behaviour	<i>n</i>	Increased IA	<i>n</i>	Improved ACS	<i>n</i>
Client tracking system	8	Client's opinion	4	Unstructured evaluation of other behaviour	10
Frequency aggressive behaviour	4	ABSQ	1	Unstructured evaluation of arousal reduction skills	8
				Frequency ACS	7
		Heart rates	1	UCL	2

Note: unstructured effect evaluation is done by staff or referrers. *n* = number of psychomotor therapists mentioned the product evaluation.

### *Step 6b: Process evaluation*

Evaluation of the process of the treatment was done by seven psychomotor therapists, one of who did not provide a description of the type or content of the evaluation. The therapists evaluated the process together with others, by for example using feedback of the client (*n* = 3) or evaluating with colleagues (*n* = 3). In all but one cases, the process evaluation had led to changes in the programme (*n* = 5). Three psychomotor therapists planned to develop process evaluations in the future. Two therapists mentioned explicitly that the absence of guidelines to conduct a process evaluation is the main reason for not planning the evaluation.

### **3.2 Outline of coherence of the programmes**

Table 6 presents the coherence between steps relating to the content of the applied programmes (steps 1, 2, 3 and 6). IA and ACS are the main elements of PMT that are mentioned throughout the different steps of the Intervention Mapping approach. Throughout the successive steps, the PMT-programmes seem coherent for ACS as every step builds on the previous steps. There appears to be less coherence across steps for IA. The use of the concepts 'overall IA' and 'anger related IA' in the first two steps was not consistent across therapists. Furthermore, the adoption of a theoretical orientation with regard IA was limited, while the effectiveness of IA was only seldom evaluated.

**Table 6.** ACS and IA mentioned by 17 PMTs in step 1, 2, 3 and 6.

Step 1: determinants	<i>n</i>	Step 2: objectives / outcomes	<i>n</i>	Step 3: theories/models, methods, PMT-methods used and specific strategies	<i>n</i>	Step 6: effect evaluation	<i>n</i>
Limited ACS	17	Increasing ACS	16	Action-oriented PMT; Experience-oriented PMT Based on: social learning theory, cognitive theory and behavioural theory as in CBT; CBT; GAM; BPS-model; Humanistic theory	11 10 14 7 2 1	Effect evaluation	16
Focused on arousal reduction	8	Focused on arousal reduction	9	Arousal reduction exercises	13	Unstructured evaluation arousal reduction skills	8
Focused on other behaviour	17	Focused on other behaviour	12	Stepping out of the situation	14	Unstructured evaluation other behaviour	10
Skills in social situations	17	Skills in social situations	7	Role plays	6	-	
Limited IA	17	Increasing IA	12	Experience-oriented PMT Based on: GAM; BPS-model	10 7 2	Frequency of ACS (overall) UCL (general coping questionnaire) Effect evaluation	7 2 4
Anger related	17	Anger related	6	No distinction between anger related or general IA Using tools to visualise tension General exercises with focus on IA	16 5	Clients opinion (anger related)	4
In general terms	6	Overall	11			Heart rates Clients opinion (in general terms)	1 1
Mixed IA and ACS		Link between IA and the use of ACS		Homework assignments on IA and ACS Exercises based on the relaps plan	10 5		

Note. *n* = number of psychomotor therapists, ABSQ = Anger Bodily Sensation Questionnaire, ACS = adaptive coping skills, CBT = Cognitive Behavioural Therapy, GAM = General Aggression Model, IA = interoceptive awareness, UCL = Utrechtse Coping Lijst [Utrecht Coping List]

## 4 Conclusion

The aim of this present study was to gather information on the theoretical orientation, content and evaluation of PMT as used with individuals with MID-BIF for anger regulation problems and/or aggressive behaviour. The Intervention Mapping approach offered a clear framework for mapping the results of the study. Findings suggested that anger regulation difficulties and aggressive behaviour were one of the main reasons for referral to PMT. There was general consensus amongst psychomotor therapists on the objectives of PMT as increasing IA and ACS. The Intervention Mapping approach also revealed that there were direct links between objectives (i.e. increasing IA and ACS) and the methods applied in the PMT programmes. Where ACS was the objective, there was a high level of PMT coherence with regard the theoretical orientation and evaluation methods. Where IA was the objective, the PMT application appeared less coherent: this was particularly prominent with regard the absence of a theoretical framework to account for the development of IA. In addition, therapists interviewed also indicated they did not have measures to assess clients' IA.

Where several treatment approaches (e.g. anger management) focus on ACS, in PMT this is combined with an extra focus on the body and the information the body offers (Zwets et al., 2016). This focus on IA makes PMT rather unique. In an experience oriented and action oriented approach, individuals are offered an environment with a focus on IA and ACS. Gratz and Roemer (2004) suggest that to prevent aggressive behaviour, individuals have to be able to respond with appropriate ACS when angry. This requires a broad repertoire of behavioural reactions. However, to act in an adaptive manner when angry, individuals also need to recognise this anger. IA that is the conscious perception of body signals related to anger (Farb et al., 2015; Füstös, Gramann, Herbert, & Pollatos, 2013; Gratz & Roemer, 2004; Mehling et al., 2012; Price & Thompson, 2007). The PMT applications stress the link between IA and ACS, as both use information from the body to cope with anger, by using the body as a tool in therapy. For example, using 'tension thermometers' participants are trained to timely pay attention to their emotional state, recognise what is happening and use this recognition as a starting point for selecting an appropriate reaction, thus preventing aggressive behaviour. PMT emphasises experiencing thoughts, feelings and behaviour. By creating a 'playground', opportunities are provided to practise (new) ACS, such as ACS in social situations, using other behaviour or arousal reduction skills. The explicit focus on a possible lack of insight in one's own emotions and the fact that people can experience and train with old and new behaviour make these PMT applications suitable for individuals with MID-BIF.

The observation of gaps in the theoretical base and evaluation of IA is in line with the findings of our systematic review on PMT in this population, where evidence of the effectiveness of PMT was found specifically for ACS outcomes (Bellemans et al., 2017). In this systematic review, IA was only implicitly targeted at in PMT interventions (e.g. meditation and relaxation). In the present study, the GAM was mentioned by several psychomotor therapists as reference framework for IA in PMT. The GAM provides a limited theoretical background for the use of IA. The GAM links arousal and affect in relation with aggressive behaviour. It remains unknown whether overall IA or anger related IA influence anger regulation when preventing aggressive behaviour. This can be seen in participants' inconsistent use of the terms 'overall IA' and 'anger related IA' in relation to determinants and specific outcomes on IA. The literature offers limited guidance on this point. Until now, only one study demonstrated that children with MID-BIF and aggressive behaviour have limited awareness of their body (Emck, Plouvier, & van der Lee-Snel, 2012). Our results highlight the lack of clarity around IA, and its relation to aggressive behaviour. Similar to other target groups (van der Maas et al., 2015; Zwets et al., 2016) the effect of PMT on the IA skills of individuals

with MID-BIF remains unclear. As stated by Cali and colleagues (2015) IA is shown to be a complex construct as it is closely related to interoceptive accuracy (the accuracy of one's own body signals), and emotional susceptibility (the tendency to experience feelings of discomfort when emotionally aroused) (Cali, Ambrosini, Picconi, Mehling, & Committeri, 2015). How these concepts can be accurately measured is still a topic of debate in scientific research (Kanbara & Fukunaga, 2016).

The absence of specific instruments for the evaluation of PMT – especially for anger related IA – is also in line with the literature. For example, the Anger Bodily Sensations Questionnaire (ABSQ; Zwets et al., 2014) is an instrument emphasising body awareness or IA, but has not yet been adapted and validated for use with individuals with MID-BIF. Moreover, none of the instruments for overall IA are adapted for use with individuals with MID-BIF although several new instruments have been developed to measure IA in a general population and psychiatric patients: e.g. the Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the Multidimensional Assessment of Interoceptive Awareness (MAIA; Mehling et al., 2012), the Scale of Body Connection (SBC; Price & Thompson, 2007). In addition, an instrument measuring anger in association with ACS is also lacking. The Profile of Anger Coping Skills (PACS; Willner, Brace, & Phillips, 2005) is an instrument to measure anger related coping skills in this population but it is not yet available in a Dutch translation.

The present findings have implications for the development and evaluation of PMT programmes for individuals with MID-BIF and aggressive behaviour. For the development of a standardised PMT programme findings highlighted a number of areas for improvement of PMT as an intervention. It is likely that a more crystallised description of the role of IA will positively influence the theoretical framework on which PMT is based on, and lead to a more sophisticated repertoire of practical PMT applications, thus increasing the effectiveness of PMT. Possibly the Polyvagal theory of Porges (2009) will give handles for a stronger theoretical framework of PMT. Moreover, it is important to develop an adequate evaluation plan for PMT. However, to conduct a proper evaluation it is imperative to have measurable outcomes and thus specific instruments. Adaptations and/ or translations of instruments for assessing IA (e.g. ABSQ) and ACS (e.g. PACS) are urgently needed. These instruments could be used as a standard practice within PMT to gather information on the mechanisms of action and the effectiveness of PMT.

The Intervention Mapping approach has shown to be a valuable tool to evaluate the process of the PMT-programme, revealing also the gaps in the coherence of the programme, an overview that was lacking until now. Intervention Mapping as used in this study can be used in the future as a tool for the process evaluation of PMT.

This study has several limitations that should be taken into account. First, the choice of Intervention Mapping over other tools (e.g. Online course on developing logic models and evaluation plans, Logic Model Overview) was based on the fact that Intervention Mapping allows both pinpointing and drawing up an inventory of PMT targeting anger regulation difficulties and aggressive behaviour in individuals with MID-BIF. Information provided by the psychomotor therapists reflects how PMT is currently applied by this group of therapists in Dutch residential facilities. However, we did not check the programmes in practice nor did we check its manuals, as these were generally not readily available. Second, it took several attempts for psychomotor therapists to formulate an answer, and in most cases they asked explicitly for examples to be able to answer the question. It is likely also that their responses might have been influenced by their education. It is not clear if and to what extent therapists' educational background has implications for their practice. Possibly psychomotor therapists apply these activities because they are educated to do so, even though strong theoretical foundation is lacking.

The present study has used a relatively novel approach to map the content and coherence of PMT programmes as currently applied in Dutch facilities serving clients with MID-BIF who present with anger problems and/or aggressive behaviour. This study may be a first step in developing evidence-based practice in which programme development, instrument validation and outcome evaluation are linked. In this way, PMT may add to the range of treatments that have been shown effective in reducing aggressive behaviour in clients with MID-BIF. Future research should focus on exploring the relationships between ACS, IA and anger. In particular, IA has seldom been examined in the scientific literature. IA is an interesting construct to explore and future research should aim at investigating the psychometric properties of the ABSQ for use with clients with MID-BIF and anger regulation difficulties.





## CHAPTER 4

Psychomotor therapy for individuals with mild intellectual disabilities or borderline intellectual functioning presenting anger regulation problems and/or aggressive behaviour: a qualitative study on clients' experiences



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## **Abstract**

**Background:** Psychomotor therapy (PMT) is often applied in Dutch clinical practice to address aggressive behaviour in individuals with mild intellectual disabilities or borderline intellectual functioning. However, the literature on clients' experiences is lacking.

**Methods:** An interpretative phenomenological analysis was used to analyse the semi-structured interviews of seven participants (19–60 years; 4 male) who completed PMT targeting anger regulation problems.

**Results:** According to the participants, becoming aware of increasing tension and/or learning to downregulate the tension were the main goals of PMT. They emphasised both the possibility to learn by doing and the therapeutic alliance as essential to create a safe context, where participants can experiment with alternative behaviour. After completing PMT, participants perceived fewer aggressive outbursts and an increased self-esteem.

**Conclusion:** Participants in our sample experienced PMT as helpful targeting anger regulation problems and aggressive behaviour. The experiential character was perceived as a valuable aspect of PMT.

## 1 Introduction

Psychomotor therapy (PMT) stands for a variety of interventions using movement and body experiences, with different origins. The origins include physical education, physiotherapy, body psychotherapy, martial arts, and yoga, which all share the same principal idea that movement, physical exercise, and bodily experiences can be used in a therapeutic manner to target behavioural, psychological, or psychiatric problems (Emck & Scheffers, 2019; Probst, 2017; Röhricht, 2009). In PMT, interventions are used both to learn concrete skills (i.e., action-oriented approach), but also to experience and gain insight into emotion regulation (i.e., experience-oriented approach) (Emck & Scheffers, 2019; Probst et al., 2010).

The evidence base for PMT is growing with clinical studies and a few reviews and meta-analyses providing positive results for interventions using movement and body experiences as a medium in the prevention and treatment of many kinds of mental health problems in several populations (Bloch-Atefi et al., 2014; Koch et al., 2014; 2019; Papadopoulos & Röhricht, 2014; Priebe et al., 2016; Vancampfort et al., 2021). Thus, PMT interventions are widely used in a broad range of mental health populations, including individuals with mild intellectual disabilities or borderline intellectual functioning (MID-BIF). One of the focal points in PMT is the (disturbed) regulation of emotions related to aggressive behaviour (see Boerhout et al., 2013; Zwets et al., 2016).

In the light of treating anger regulation problems and aggressive behaviour, it is assumed that when a person is aware of one's anger-related bodily signals, this facilitates emotion regulation and as a result, it might prevent aggressive behaviour (Boerhout et al., 2013; Füstös et al., 2013; Gross, 2015; Price & Hooven, 2018; Zwets et al., 2016). Empirical studies support the importance of being aware of anger-related body signals and adequate coping with anger in the light of anger regulation and preventing aggressive behaviour (Boerhout et al., 2017; de Looft et al., 2019; Ter Harmsel et al., 2021). Especially in people with MID-BIF, aggressive behaviour caused by deficient anger regulation is a well-known problem. Prevalence rates vary between 10% and 20% and raise to 50% in inpatient treatment settings for individuals with MID-BIF who demonstrate severe and challenging behaviour (Tenneij & Koot, 2008). Aggressive behaviour has the potential to adversely affect not only the individual with MID-BIF but also his or her family and support staff. It may lead to several consequences such as isolation and mental health sequela (Hensel, Lunsky, & Dewa, 2014; Woods & Ashley, 2007). To address anger regulation problems and aggressive behaviour in clients with MID-BIF, different programs have been developed and studies mostly focus on adaptive coping skills such as mindfulness-based programs as well as progressive relaxation (Bellemans et al., 2019). While there is indeed evidence for the efficacy of these programs from both qualitative and quantitative studies (Bellemans et al., 2019; Chapman & Mitchell, 2013; Currie et al., 2019; Griffith et al., 2019), in practice therapist emphasises that for individuals with MID-BIF also not only coping but also the awareness of anger related bodily signals is a key (Bellemans et al., 2018). However, specific knowledge on the efficacy of PMT, which uses besides an action-oriented approach also an experience-oriented approach to gain insight into anger regulation, is still lacking.

Until now, no studies have explored the experiences of clients with MID-BIF receiving PMT targeting anger regulation problems and aggressive behaviour. A qualitative approach emphasising client's views on both the results and the working mechanisms of an intervention might provide relevant information on valued and disliked therapy aspects in order to improve its quality and effectiveness (McDonald et al., 2003; Walmsley, 2004). Recently, studies show the relevance of clients with MID-BIF expressing their experiences about therapy they receive (Brown et al., 2011; Currie et al., 2019; Griffith et al., 2019). Where

PMT is concerned such a study should address a broad range of therapy factors, both PMT-specific as well as non-specific factors, such as the therapeutic relationship between therapist and client, as both factors affect the efficacy of the therapy (Wampold, 2007). The first indications of the importance of non-specific factors, such as the role of the therapeutic alliance in PMT within adults with mental health needs, are already presented by Heynen et al. (2017). For the specific factors, interoceptive awareness (IA) and adaptive coping skills are mentioned by the psychomotor therapists working with people with MID-BIF and anger regulation problems and aggressive behaviour (Bellemans et al., 2018). However, no information is yet available on this issue from people with MID-BIF.

To address the aforementioned gaps and in line with the suggestions for future research by Papadopoulos and Röhricht (2014) we have set up a qualitative study exploring the experiences of clients with MID-BIF who have participated in PMT targeted at anger and aggression.

Therefore, in the present study, we used interpretative phenomenological analysis (IPA; Smith et al., 2009) as a qualitative method to explore what individuals with MID-BIF think and feel with regard to their PMT treatment. IPA is a suitable approach for exploring how individuals with intellectual disabilities (IDs) perceive situations and how they integrate it into their personal and social life. The goal of IPA is to explore how persons make sense of events, embedded in a broader personal and social context. In this study, for instance how participants felt when they were working with the psychomotor therapist and how they experience when their anger problems were topics of interest. IPA studies have small sample sizes allowing in-depth engagement with each participant and exploring similarities and differences between participants (Smith et al., 2009). In individuals with IDs, IPA is appropriate when the sample and the analysis are described in detail (Rose et al., 2019). This study aims to pursue a better understanding of the client's unique perception of PMT targeting anger regulation problems and aggressive behaviour. Emphasis is on the experienced results as well as on experienced mechanisms of action of PMT.

Several topics were explored with the participants to gain insight into the (a) perceived goals of PMT, (b) PMT elements experienced as helpful throughout the therapy process, and (c) client's opinion on the added value of PMT. The topics that were addressed were chosen and analysed in such a way that they can provide additional information besides the information gained from the literature (empirical research) and from clinical experts (psychomotor therapists). This information from different perspectives can be used in order to improve the quality of PMT targeting anger regulation problems and aggressive behaviour in people with MID-BIF.

## **2 Methods**

### **2.1 Sample selection**

Clients with MID-BIF who completed PMT targeting anger regulation problems and aggressive behaviour related to the participating institutions were approached by the researcher. Three persons were not interested in participating in the study, and, therefore, they were not further approached. The seven persons who showed interest signed an informed consent (see procedure section).

### **2.2 Participants**

Seven participants who completed PMT targeting anger regulation problems and aggressive behaviour in the previous month took part in the study. The sample was comprised four men and three women.

Characteristics of the participants, reflecting the clinical population, referred to PMT for anger regulation problems, are provided in Table 1. Pseudonyms are used to protect anonymity. Participants' ages ranged from 19 to 60 years with a mean age of 36.7 years. The mean IQ-level was 73 (SD = 9.62, range: 60–85). Two participants had additional diagnoses. These two participants lived in a group setting in an institution for adults with IDs. Four participants lived in an apartment with professional support available 24/7, while one participant lives independently without professional support. All participants were referred for PMT due to their anger regulation problems or aggressive behaviour for the first (n = 4) or second time (n = 2). One participant had received PMT about one year ago and received some booster sessions in the months before the interview.

### **2.3 Intervention**

Participants met the psychomotor therapist individually once a week for one hour, during a period of 15–54 weeks (see Table 1). For the participant who had already ended regular therapy, the booster sessions were held weekly over a period of 4 weeks. In PMT, a mixture of action- and experience-oriented approaches were used, using movement/sport activities and body experiences as a medium in the approach in order to both increase awareness of anger-related body signals and increase the ability to downregulate physical tension related to anger. The aim of this complementary therapy was similar to psychological approaches, namely to decrease emotion regulation problems and aggressive behaviour. In contrast to psychological approaches but in line with physiotherapy or physical education, the method used was working with and through the body. In the therapeutic setting, the tension was created by the activity or the material context (e.g., participating in challenging activities with a material obstacle). Later on in the therapy process, this was done by manipulating the social context during a movement activity (e.g., being challenged by the therapist during a basketball game). In every phase, the focus was on body signals related to tension/anger, and when tension raised the participant received tools to downregulate this tension. Besides the therapeutic sessions, the participants also received a booklet with homework assignments to practise the learned skills during the week by themselves or with the support of their caregivers.

**Table 1.** Characteristics of participants.

Variable	Participants (pseudonyms)						
	Jenny	Ivy	Daniel	Jane	Jake	Ed	Gene
Gender	Female	Female	Male	Female	Male	Male	Male
Age (years)	34	28	21	60	53	42	19
Additional diagnose	Motor impairment, Epilepsy	None	None	None	None	None	Autism
IQ score	64	83	85	67	77	76	60
Living situation	Living together with other people with ID in an institution	Assisted living, together with other people with ID	Assisted living, together with other people with ID	Individually	Assisted living, together with other people with ID	Assisted living, together with other people with ID	Living together with other people with ID in an institution
Received PMT	Regular	Regular (a year ago) + recently booster sessions	For the second time (first time during childhood)	Regular	Regular	For the second time (first time > 10 years ago)	Regular
Intensity	1 session per week, for 43 weeks	1 session per week for 22 weeks, + 4 booster sessions	1 session per week, for 28 weeks	1 session per week, for 16 weeks	1 session per week, for 32 weeks	1 session per week, for 15 weeks	1 session per week for 54 weeks

## 2.4 Study Procedure

The Scientific Research Committee and the Ethical Committee of Social Sciences of the Behavioural Science Institute of the Radboud University approved this study (ECSW-2019-080). The participating institution declared to be the partner in this study and gave permission to collect data. The inclusion criteria for the participant were (a) an IQ score between 50 and 85 (MID-BIF), (b) an age of at least 18 years, and (c) the last PMT session took place in the month previous to the interview. Owing to the third criterion, purpose sampling was used. All participants were individually approached by the researcher, with an information letter (covering the content of the study and the confidentiality of the data). They signed an informed consent form after they were explicitly told that cooperation was on a voluntary basis (that they were free to withdraw at any time) and data were processed anonymously. Clients gave also permission to ask the personal caregiver for additional information on the clients' experiences when needed due to their limited verbal capacities. The interviews took place at the homes of the participant. Two personal caregivers, related to those clients with the lowest IQ levels, were approached for extra information to compare and confirm the completeness of their answers. The participation of the clients was rewarded afterwards with a little present (i.e., a stress ball).

Interviews were conducted between January and July 2020 by the first author, who has clinical PMT experience in working with individuals with IDs though was not involved with the PMT process of these participants. The first author was supervised by the second author, who has experience in qualitative research in individuals with IDs (though is no expert in PMT). An interview schedule with key topic areas was developed, based on the topics as used in the interview in the study of Chapman and Mitchell (2013), as well as the topics mentioned by the PMT therapist in the study of Bellemans et al. (2018) and relevant literature, with the cognitive abilities of the participants in mind and were intended to be used flexibly to facilitate open-ended discussion in this study.

The schedule covered six topic areas, including (a) nature of emotional regulation problems they were experiencing at referral, (b) perceived outcomes of PMT, (c) which activities they remember and what they learned from it, (d) which activities they still apply themselves at present, (e) the nature of their emotional regulation at present, and (f) what were pleasant and unpleasant aspects of PMT. A training took place to ensure that the interviewer was familiar with this interview protocol. Care was taken in the phrasing of questions to ensure that participants understood (Finlay & Lyons, 2002). For example, in the open question words were chosen that were part of day-to-day language, without ambiguous meaning. And during the interview, phrases were short and we asked for concrete examples.

The duration of the interview ranged from 24 min to 68 min, with a mean duration of 52 min. All interviews were recorded and transcribed verbatim with the consent of participants. As mentioned by Hollomotz (2018), in individuals with IDs it is also important to involve the context of the participant. Therefore, we used additional information of personal caregivers of those participants who had difficulties in verbalising. The information was used to check whether we received a correct and full picture of the mentioned items by the participant (e.g., treatment goals and observed changes and findings on the clients' experiences), or to add some in-depth information that was not provided by the participant.

## 2.5 Data Analysis

An IPA was adopted to underpin the methodology and analysis of this research as it was concerned with the detailed understanding of how individuals with MID-BIF view and experience PMT. IPA was chosen as it provides the opportunity to engage as a researcher in a dynamic and close way with the reflections of the participants' experiences (Smith & Osborn, 2015). IPA is characterised by an explicit recognition of the interpretative nature of the process and that any findings are a result of this interpretative process. In IPA, the assumption is that the participant can use the interview process to interpret their experiences and make sense of them in the context of questions posed by the interviewer. Next, the researcher interprets the answers of the participants at the analysis stages, both in the context of own experiences and beliefs as well as in the context of the collective insights of the participants. In order to do this in the present study, the researcher read and reread the transcripts and the memos (e.g., initial notes and comments) on each transcript, highlighting the content, the use of jargon, and potential conceptual and contextual elements. This resulted in identifying emerging themes by exploring patterns across the initial transcripts and notes. These themes were then grouped together, and connections between them were explored to produce higher-level overarching themes. This iterative process led to covering themes that represent the whole cohort. To ensure that the analysis was carried out in a rigorous way and that interpretations made by the first author were of an explicit nature, a second researcher (NPS) provided an audit of the analysis. This analysis was conducted independently by the second researcher. When inconsistencies occurred, they were argued to an agreement. The final analyses were also checked by two other authors (RD and JTB). Triangulation was used as the information of the caregivers was compared to the experiences of the clients on content and completeness of their answers. All analyses were carried out in Dutch. In the report when using citations, (...) indicates omitted material and [] indicates additional information added by the researcher.

Throughout the data collection and analysis process, a reflexive diary was also kept to increase the trustworthiness of the analysis. All issues were discussed with three of the authors (NPS, RT, and TB). This highlighted a number of issues for consideration for the interviewer. First, the interviewer was aware of having a special interest in why particular exercises were experienced as useful and therefore reflected on whether this was felt by the participants as being more important. Another issue was the balance between sticking too rigidly to the semi-structured interview schedule and the more open exploration of the issues raised by the participants during the interview. Reflection on these issues and the discussion of the process and themes with the members of the research team allowed issues to be addressed when needed, for example, adding all kinds of prompts to the interview schedule, and as a result a more flexible use of this schedule.

### 3 Results

In the interviews, three overarching themes emerged that were related to (a) participants views on main treatment goals, (b) their evaluation of the activities and interventions offered during PMT, and (c) their perceived effects (objective and subjective) in the context of anger regulation problems and aggressive behaviour.

#### a. Main treatment goals

*Now after PMT, I am able recognise it [shifts in body signals while anger increases]. As I clench my fists and I become grouchy or I become angry. Before PMT, I didn't notice that at all. Yes, before PMT it suddenly appeared out of the blue. (...) Before, I did not recognise the signals as I recognise them now. (Daniel)*

*Now [after PMT] I know what to do when I'm frustrated and as a result, I do not have outbursts anymore. (...) Before I got PMT, I felt the tension increase. First it started as feeling irritated, but I only bottled up the tension, then it ended in an outburst. (...). I learned [during PMT] to say 'stop'. (...) In PMT, I learned to draw the line, not only to say it, but also to fortify this by saying it and supporting it with my facial expression and body posture. (Ivy)*

Like Ivy and Daniel, during PMT all participants were learning the importance of recognising and being aware of changes in their body signals (i.e., IA), especially in relation to their personal history of increasing anger. Before PMT some clients, like Daniel, got overwhelmed by anger, whereas others, like Ivy, were aware of increasing tension, but lacked the skills to down regulate the tension. While the first type of clients used PMT to get insight into their anger regulation and then learned to cope with their anger, the other group focused mainly on PMT strategies to down regulate or cope with this increased tension.

During the interviews, we observed several situations in which the participants applied the techniques they have learned during PMT. While Daniel was talking about his sadness about his grandfather passing away, he placed his hand on his belly and used a breathing technique he learned during PMT. He focused on his breathing and became more relaxed and calmer. Similar to Daniel, some participants were aware of the changes in their body signals linked to anger, were able to reflect on that and adequately applied a PMT strategy to downregulate the increased tension while emotionally aroused during the interviews. Thus, these participants were able to generalise the learned knowledge and skills to other situations and emotions.

*I feel it in my stomach [when angry], then I have a kind of tingling feeling. I don't know exactly how to describe it. (...) Now something else happened, something that makes me sad [one of the key-workers is diagnosed with breast cancer]. Sometimes I feel it [tingle in her stomach] (...) and my personal care giver tells me than that I have the sadness in my stomach. (Jenny)*

Some participants, like Jenny, had difficulties in verbalising or conceptualising what they have learned during PMT. However, they were able to apply the learned skills, for example, when they talked about intense emotions. As is illustrated in the citation above, Jenny talked about how PMT helped her to understand and cope with her anger during her interview. She also told the interviewer that when one of her personal caregivers was diagnosed with breast cancer, she noticed different body signals, but was not able to associate them with sadness. Also, she did not think to apply the learned techniques to downregulate

the bodily tension like she now can when she is angry. It seems that Jenny, in contrast to participants like Daniel, is not able to generalise what she has learned during PMT to other emotions and situations. In order to use PMT in new situations, Jenny needs the help of staff members. Also, Ivy reflects on this issue:

*When I had to go to work, I became insecure again because others had more experience, so I didn't feel equal. That was when I thought 'I could need PMT once more, just to prevent problems'. (...) And after two booster sessions, I could go on. PMT brought me already so much, I just needed the booster to maintain it. (Ivy)*

During Gene's interview, the interviewer asked him a question that he found difficult to answer. He then walked out of the room and called one of his caregivers. She asked him if she should help him. Gene nodded and gave his caregiver a paper: his tension thermometer.

*Gene works with a tension thermometer, and when we notice that he does not understand the question, like now, and he feels tense, or becomes angry, we use the tension thermometer. We can ask him some questions about what is going on, how we can help him to become calm again. (Caregiver Gene)*

As shown here, Gene was able to use the right strategy when his tension increased because he felt not able to answer the question (i.e., asking his personal caregiver to help him). Later during the interview, Gene did not find the words to explain his breathing exercise:

*How shall I explain the exercise with breathing in and breathing out? [Gene lies himself down on the floor and his caregiver tells the interviewer that he puts his hands on his belly with his fingers crossed while he starts breathing towards his belly. Breathing in with his nose and breathing out by blowing.] (...) When I do this, I can focus on my breathing only, and that helps me. (Gene)*

Like Gene, many participants with MID-BIF might have difficulties in verbalising their emotions and reflecting on situations and talked about how important it was for them to learn through experiences instead of only talking about these situations. The combination of actively participating, experiencing the body signals (and thus the inner emotional experiences) and using verbal support to clarify situations, emotions and the consequences of the behaviour of the client based on their own experiences is precious to the participants as they felt more in control during PMT as during other treatments.

#### *b. Activities and techniques applied during PMT*

From the interviews three phases could be distinguished with activities, namely activities aiming at (1) increasing IA, (2) down regulation of body signals, and (3) integration of IA and adaptive coping skills during movement and sports activities.

*We build a tower of foam blocks and then I had to knock it down. (...) Just to throw out all my anger. And because of the foam blocks you can't wreck anything, so that is fine. The nice thing about this, you can feel the build-up tension collapse at that moment. It feels really good when the tension disappears. (Jane)*

*I use colours. Red and orange: then you should stay away. Green means it is okay, and yellow means so so. And there is also black, but that is not good at all. Black is above red, and it goes together with a rage of anger. (...) And I also link it to animals, because that visualises it even*

*better. When I am a snail, I stay at home and stay save like in a shell. An owl, then I keep an eye on the situation, and a lion... that I try not to be. Instead I prefer to be a cat or dog, as that indicates that I am relaxed. (...) In a later stage in PMT, the colours are associated with animals. That is how I better understand the increased tension. (Jake)*

*Clenching fists are associated with situations where someone else treats you bad. That is one stage further than feeling nauseous and an increased heartrate. And the first stage is when you just feel a bit agitated, and your breathing becomes a bit heavier. (Daniel)*

During PMT, the participants did the exercise to become aware of their level of tension. For example, participants were engaged in often used symbolic exercises, like Jane, to make the tension visual and thus to support the verbal messages during PMT. Other exercises helped participants to experience their bodily tension during increasing and decreasing arousing situations, such as walking a course with blindfolds or completing an altitude trail with climbing and balancing. Often, these exercises were combined with visual tools such as a tension thermometer. This is an image of a thermometer, in which elevated levels of tension are visualised on the thermometer with colours turning from green (relaxed) to orange (irritated) and to red (angry). Other clients, like Jake, also linked the increased levels of tension to animals as turning from a cat (relaxed) into a lion (angry, ready to attack). These visualisations helped the participants to recognise, remember and reflect on increasing tension and anger, and it gave also concrete tools to communicate about their arousal levels with others.

*One of the exercises I still often use is the breathing exercise. When you are angry, you need to breath in, just hold it and then breath out again. Every time you breath out, you blow the anger out of you, further and further away from you. And as a result, you become totally calm. (...) But sometimes that isn't sufficient. Then I have some other manners: listening to music, walking, playing a video game, cuddle with my rabbit. And when things really bother me, I go to the horse farm. (Daniel)*

*When I notice that my tension is high, and it is really bad, I go for a walk and I visit the animals of the farm. I know, I can relax over there. (...) First, I walk out of the situation, I count to ten. Very often I feel calm after that. But sometimes I have to pay attention to my breathing as well, and when that doesn't work, I have to go for a walk. And my final rescue is the farm where I can meet the horses and cows. (Ed)*

In all participants anger was linked to a tingle in their stomach, heavier breathing, increased muscle tension and increased heart rate. While the body-oriented activities helped them to become aware of these body signals, participants noted that the down regulating strategies they learned during PMT such as breathing techniques and relaxation techniques were helpful in down regulating the physical arousal related to anger. Others, like Daniel and Ed, described other strategies that were explored during PMT including seeking for distraction (e.g., listening to music or go for a walk). Also seeking for social support (e.g., asking for help or talking to the caregivers) was mentioned. Some participants, like Ed, have insight into the different phases of increasing tension, associated with strategies that can help in each phase to calm down again. As a result of PMT, some participants found out that being (physical) active also can prevent outbursts, helps as a distraction or can be used as a coping skill to decrease tension and/ or leads to relaxation: "At this time [after PMT], I take an aqua jogging class. (...) Just some moments for myself, moments to enjoy and relax." (Jane)

*On a certain moment [during an exercise where Daniel had to walk with a blindfold, guided by the psychomotor therapist], I noticed that we stepped on the aircushion. Then the psychomotor therapist started to jump and uhm. Then I thought by myself, this is taking matters to far. But he [the therapist] said to me: 'You've should told me earlier to stop. If the tension was already elevated, you should definitely not go beyond your limits. So probably, you could have mentioned you felt tense when you knew we were approaching the aircushion. Or you could only have said stop. (...) In PMT you can make mistakes without serious consequences. We had really good laughs about that. (...) You can try out what would be a good strategy or not. That is funny to do, just exploring the results of different strategies. That is helpful because you can discover the consequences without being in a real situation. So, you can practice these new strategies. (Daniel)*

*The power of PMT. Thinking and doing together with the therapist, without any obligation. And being open to each other. (...) And then afterwards bringing it back into practice in the activity. (...) The psychomotor therapist said what she observed, she asked whether I also noticed the same. When I was not able to notice it, she told me to do an exercise to focus on my hands and then she asked it once more. Often I could then tell her what was exactly bothering me. Afterwards, we thought about possibilities to solve the problem, and we tried them out. When I did not knew how to start, she came with advices. (...) Often I have to do things grudgingly, lets say under compulsion. But in PMT I could talk about it with the therapist or I could say no. Better said, I could do thing at my own pace. (Jake)*

When participants were able to identify their body signals and down regulate their physical arousal, sports or movement-oriented activities were used to promote their awareness and practice with their coping skills to decrease their tension. During these activities, such as football, basketball or obstacle races, participants were exposed to feelings of frustration and anger. These safe, but at the same time challenging situations, created a good base for a therapeutic conversation with the therapist to promote the insight of the participants and (the consequences of) their behaviour. Several participants mentioned during their interview how the different contexts (e.g., using sports materials) and different kinds of activities (e.g., sports-/movement and body-oriented activities) evoked other expectations of the therapy compared to other, more verbal treatments. Like Jake, they felt in control as PMT was seen as a therapy without obligations, but adapted to their own needs, preferences, and pace. Furthermore, the answers of the participants showed that, as a result of the personalised character and the adaptations made by the therapist to match a participant's wishes and need, they felt their sense of autonomy increased. The participants emphasised that they were given the possibility to practise alternative, sometimes newly learned behaviour in a safe therapeutic setting, in which it is possible to learn by mistakes. In the light of this, clients describe how vital it is that in the sessions clients and therapist were working closely together. The trust in the therapist seems a result of mutual respect between therapist and client, as well as the attunement of the therapist to the clients' needs and perspectives in regard to formulating shared goals and jointly create solutions (with equality between the therapist and the participant).

*At first, I didn't want to do the exercise. (...) Later on [after several sessions], I wanted to do it together and in the end I did it alone because I trusted the psychomotor therapist ...She [the psychomotor therapist] takes me seriously. She does not interrupt, only when I fall silent... but then she explains it in an adult way and not childish. She treats me like a valuable person. (Ed)*

*The first time he [the psychomotor therapist] did not challenge me. The first couple of sessions, I could get to know him. And the psychomotor therapist always explained well what he was going to do. He had this cap, the 'challenge cap'. If he wore this cap, then he tried to challenge me. And just after the exercise, when we talked about what happened [during the exercise] he took it off. Then we could talk about what went well, what I could have done in a different way, and then we went on with the exercise if there was some time left. (Daniel)*

According to the participants, not only the activities are important in PMT, but also the therapists have a crucial role and a good therapeutic alliance is essential to create a safe context in which the participant can experiment with alternative behaviour. During PMT, the therapist uses specific therapeutic techniques including, but not limited to, visualisation, giving words to situations and emotions and mirroring (i.e., replicating nonverbal signals such as gesture, attitude, and movement pattern) to provide insight into body signals and (non)verbal behaviour of the participant in situations in which the participants are (emotionally) aroused. As mentioned by the participants, humour and being able to pour cold water on the learning moments helped the participants to place in perspective and to maintain a safe therapeutic context. According to the participants, observing the therapist attuning to their needs is crucial, as well as working equally together. The therapeutic relationship that is developed was seen as a requirement before they could be challenged to experiment with the new behaviour.

*Sometimes we received a booklet. The psychomotor therapist had written down homework that I had to do together with my key-worker. (Ivy)*

*The service workers have to know what you have learned. And they have to be able to help you with the exercises etcetera. At this moment, I don't have a connection with my care giver. I have to tell her what I have done in therapy, but that is to complex. It is really important that there is a good transfer from PMT to the home situation. (Jane)*

*When I notice that my tension increases, I don't go to the common 'tea time'-meetings. Than the caregivers also know that there is something wrong. (Ed)*

Participants described how difficult it was to generalise the skills they have learned during PMT, to their daily life. Therefore, therapists promote generalising by using experiences from the daily life of the participant in their therapy. Sometimes participants were able to share those experiences with the therapists, but in other situations those experiences were shared by the caregiver. In addition, concrete tools and exercises were used in PMT and participants were promoted to use those in their everyday life. Sometimes, like in Jane's situation, therapist needed to inform caregivers about the insights, tools and exercises so that caregivers could assist the client to implement those in their daily life. Finally, from the answers it became clear that informing care givers about insights and coping strategies can help participants to implement the learned strategies as this sometimes requires them to overcome general habits or rules on wards. For example, in his interview Ed mentions that the jointly tea moments, where all clients and care givers are present at fixed times, are not always in line with his needs, especially not when his tension is already increased. So breaking the habit of these mandatory activities helped him to prevent outbursts, but requires the therapist to provide psycho-education for the caregivers in the light of preventing aggressive behaviour.

### c. Perceived effects of PMT

*Now, after PMT, I'm calmer, more considerate. I act less impulsive, it doesn't pop out like it just to do. And I don't swear or fight that often any more. Before when you looked at me in a wrong way, I started a fight. (...) But now, after PMT, I'm more relaxed and less wired. (Daniel)*

*I know now what to do when I'm frustrated, and as a result I don't have any outburst any more. (...) What I learned is, to talk about my frustration. When I feel irritated, I share my feelings [with the service worker]. (...) And listening to music. Those two things work for me. (...) Through PMT I learned to be... uhm... I just saw that I'm ... uhm... that I'm just equal, that I matter. And if you are able to see that, it is also easier to draw the line and say 'no'. (...) Also I learned to focus on the balance in my body, like grounding [she stands up and demonstrates how to stand while grounding]. That thought me to stand firm, just to ground for a second [focus on yourself instead on the other], and be self-confident so I can act in an adequate manner, without an outburst! (Ivy)*

All participants mentioned a decrease in aggressive outbursts, both in frequency and in severity, after PMT. This finding was also confirmed by the personal caregivers. The participants increased recognising and often also verbalising their anger, for example by using colours or animals related to the tension thermometer.

Furthermore, participants were better able to deal with anger as they had a larger variety of coping strategies including, but not limited to, talking with a caregiver, breathing and/or relaxation exercises and/or distracting themselves. As participants, like Ivy, experienced that they were in control of their anger, their self-efficacy and confidence increased. Before PMT, they often felt incompetent and insecure as they felt an increased tension, but were not capable to cope with it, while after PMT, they had tools to change this, which resulted in feeling more self-confident. All participants mentioned that PMT brought them the ability to have influence on their anger. The participants felt more in control and thus also less at the mercy of the (unpredictable) outbursts.

## 4 Discussion

The aim of the study was to explore how individuals with MID-BIF experienced PMT targeting anger regulation problems and aggressive behaviour. Participants distinguished three phases: (1) increase of IA, (2) downregulation of body signals, and (3) integration of IA and adaptive coping skills during movement and sports activities. According to the participants, PMT treatment resulted in a reduction of aggressive outbursts due to their improved IA (i.e., the consciousness of body signals related to anger) and adaptive coping skills, which in turn induced more self-control, and both an increased self-efficacy and self-esteem. This two-way approach when anger regulation is concerned (or a lack of adaptive coping skills, or a lack of both IA and adaptive coping skills) is congruent with the treatment aims described by psychomotor therapists (Bellemans et al., 2018) and therefore treatment aims as expressed by the psychomotor therapists accord with the goals as perceived by the clients. Furthermore, it seems that the applied PMT activities seem to contribute to the treatment aims. The perceived effects of PMT described by the participants are in line with the existing quantitative research on PMT targeting anger regulation problems and aggressive behaviour conducted in other settings or populations, respectively, eating disorders and forensic settings.

For example, Boerhout et al. (2017) and Zwets et al. (2016) have concluded that also in these groups PMT leads to an increased IA and/or increased adaptive coping skills, or self-efficacy.

### **The findings embedded in Franks' transcultural model of healing practices.**

PMT can be seen as an eclectic therapy, similar to art therapies, in which both specific key elements (i.e., a focus on IA and adaptive coping skills) as common aspects of various treatments are responsible for a successful treatment (Emck & Scheffers, 2009; Schweizer, Spreen, & Knorth, 2017; Wampold, 2019). Next to the three key-elements, participants mentioned throughout the interviews an interplay of different common factors, which are in line with Frank's transcultural model of healing practices, that is also used in psychotherapy (Wampold, 2007). These factors include (1) the emotionally charged and confiding relationship between therapist and client, (2) a healing context that creates hope, (3) a rationale (theoretical model), and (4) treatment procedures in accordance with the rationale of the treatment.

In line with the first factor of Frank's model, all participants mentioned the role of the psychomotor therapist and the working alliance as a crucial element of PMT. As participant and therapist, both with their own characteristics, bond and start to trust each other, working alliance originates. The authentic and equal relationship as well as the agreement about treatment goals create a safe setting to learn and experiment with new behaviour. Thus, body- and movement-oriented activities as such might not be evenly effective as this experiential approach, in which the activities are embedded in a safe therapeutic context and relationship. According to the participants this safe context made it possible to be triggered or challenged by the therapist or the activity, which was necessary to get insight and to generalise the learned skills in daily life. In PMT, it is customary to use co-creations. The activities used as well as the attunement stresses the perceived equality between the participants and the therapist, which makes it easier to agree about the goals and tasks of therapy. This is seen as an important part of the therapeutic relationship. Although alliance seems a prerequisite for a safe therapeutic context, in clinical practise often only short term treatments are possible in the light of reimbursed care. As a result establishing a working alliance in such a short period seems challenging. The findings on the therapeutic context and relationship add to the findings of Stubbs et al. (2018) as they argue that the effects of movement interventions are in favour when supervised by qualified experts. Participants described PMT as an intervention that differed from other therapeutic interventions which they have been given before. The therapeutic context (i.e., using sports materials and a gym or other contexts created for sports) invites the participants to move and to be moved. Using sports or movement activities and working with the body make PMT a specific and easily accessible approach. With the support of a therapist, the activities can be completed with success in motivating through a safe context (Emck & Scheffers, 2019). By using sports and body experiences, PMT enhances motivation (Kolb, 2015). Not only because there is a pleasure to be found in these kinds of activities but also because of their concrete character which fits the characteristics and learning strategies of individuals with MID-BIF who find themselves able to participate with no restrictions (Kolb, 2015). Furthermore, PMT seems to facilitate the participants to generalise the learned skills in daily life by the concrete applied techniques and practising these techniques as well as newly learned behaviour repetitively in various movement situations. This creates a context of healing (factor 2 of Frank) in which the participants believe that they can change their situation and can influence their aggressive behaviour. The plausible explanation (i.e., the rationale as factor 3) for the problems faced by the participants concerns a deficiency in the use of the body both as a barometer for remarking an increased tension or anger and as a tool for downregulating

this tension. Concrete techniques, such as breathing exercises and games incorporating body awareness, have been shown to be effective in psychotherapy for people with IDs and in reducing their aggressive and disruptive behaviours (e.g., Lewis et al., 2016; To & Chan, 2000). Although follow-up sessions and active guidance are necessary to enhance generalisation, these concrete techniques result in healthy actions of the participant as they can apply the learned downregulation strategies in daily life and some of them start to get insight into their anger regulation. Hence, based on the interviews we argue that next to relationship and specific factors (enhance the awareness of body signals and downregulating strategies), the healing context that creates hope, the rationale (the theoretical model), and treatment procedures that are in accordance with rationale of the treatment contribute to the treatment effect.

### **Strengths and limitations**

In this study, we aimed to contribute to the limited number of studies investigating PMT by providing insight into the experiences of seven participants with MID-BIF. Although the sample might seem small, saturation was reached across (in terms of the emergence of the themes) and within cases (in terms of a rich and full picture for each participant) and the number of participants was in line with the guideline of using five to ten participants for an IPA method (Smith et al., 2009).

We interviewed the clients approximately a month after they finished their last PMT session. Therefore the participants had to rely on their ability to think back and reflect on things in the past, which is generally accepted to be limited in individuals with MID-BIF. To fill this gap, we additionally checked the answers with the remarks of the personal caregivers, to ensure their validity (cf., Hollomotz, 2018). We found that the participants had similar views on PMT as their personal caregivers, although the supplemental information of the social network was enriching.

However, the results of this study must also be interpreted with prudence as it did have several limitations. First, only participants who completed their treatment were included in this study. As a result, the experiences of persons who dropped out were not included. This might positively affect the outcomes of the study. Second, some participants (with the lowest IQ levels) found it difficult at times to verbalise their opinions, especially when asked for their inner feeling when angry and when talking about transference to other emotions. Some participants tried both to understand the bodily phenomena they experienced during intense emotions and to figure out how to cope with being tense. This was sometimes difficult to verbalise, which might have led on some occasions to responding with socially desirable answers. Corby et al. (2015) point to this problem and highlighted that individuals with MID-BIF might experience difficulties in communicating emotions and the use of images and prompts. From the citations used one could get the impression that we relied more on the information of some of the participants than on that provided by others. For instance Daniel, one of the participants with better verbal capacities, was often cited in the study. This was the result of him being best able to verbally express himself in terms of emotions and reflecting on situations. However, in this study we have analysed information presented by all, also from those who had difficulties in verbalising, such as Gene. Using IPA in qualitative research is found to be useful in individuals with IDs (Rose et al., 2019); however, using alternative methods of communication might help those with difficulties to verbally express their emotions and reflect on them. In future research, special emphasis might be given to those having difficulties with expressing their emotions by using alternative methods such as icons or other visual tools like a tension thermometer combined with observations.

### **Other suggestions for future research**

In the light of the PMT-specific results of this qualitative study, future studies could include quantitative measures, such as IA and coping skills. By including these measures, the assumptions (i.e., IA is needed to be aware of anger, and is thus a prerequisite to downregulate anger) that are now the theoretical fundament of PMT concerning this population with anger regulation problems and aggressive behaviour can be examined. This is needed to build a stronger theory and thus provide the therapist to deepen one's knowledge to bring this in an attuned way into practice.

In terms of qualitative research, future research investigating the role of the therapist as a key element in PMT is warranted, as well as studies investigating to which extent the co-creations used during PMT contributed to the agreement about goals and tasks of therapy. The alliance in PMT and art therapies is already examined and seems to be an important factor (Heyen et al., 2017), but still needs to be further examined in people with MID-BIF. This also applies to other non-specific factors or therapy characteristics (e.g., therapy duration, homework assignments and involvement of informal care givers) affecting the efficacy of PMT.

### **Conclusion and clinical significance**

The results suggest that PMT targeting anger regulation problems and aggressive behaviour is perceived as a helpful intervention by participants with MID-BIF as included in this study. Key elements mentioned by clients are IA and adaptive coping skills, which are in line with the experiences of the therapists (Bellemans et al., 2018). The importance of these therapy-specific factors as highlighted in this study is confirmed in previous research on PMT targeting anger regulation problems and aggressive behaviour (e.g., Zwets et al., 2016). Besides that, the role of the therapist – therapeutic alliance – seems important, which is in line with Heynen et al. (2017). By working with co-creations clients seem to experience equality in a context in which they perceive hope is created. However, it remains unrevealed how PMT – similar to other therapies – exactly works.



## CHAPTER 5

Psychometric properties of the ABSI-id, an adapted measure for anger-related interoceptive awareness in individuals with mild intellectual disabilities or borderline intellectual functioning



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## **Abstract**

**Background:** The present study examined the psychometric properties of the Anger Bodily Sensations Interview – intellectual disabilities (ABSI-id), an adapted instrument to measure anger-related interoceptive awareness (IA) in individuals with mild intellectual disabilities or borderline intellectual functioning (MID-BIF).

**Methods:** The ABSI-id was individually administered to 208 clients (51% male) with MID-BIF in residential facilities.

**Results:** An EFA and CFA showed a two-factor structure of the ABSI-id, including 9 items. The ABS-id had moderate to good reliability, with an internal consistency ranging from acceptable to good, a test –retest reliability ranging from moderate to good and an adequate convergent validity. There was no significant difference in ABSI-id scores between individuals with MID and BIF.

**Conclusion:** The ABSI-id is a promising instrument for measuring anger-related IA, additional research is needed on validity and sensitivity of change.

## 1 Introduction

Aggressive behaviour is a significant part of problem behaviours presented by individuals with mild intellectual disabilities or borderline intellectual functioning (MID-BIF; IQ 50–85) (Ali et al., 2015). This type of problem behaviour has the potential to adversely affect the victim, the aggressor and the family or support staff. Aggressive behaviour may lead to isolation, stigmatisation and mental health sequela (Hensel et al., 2014; Woods & Ashley, 2007). To understand the emergence of aggression, different models have been developed, all assuming that while being emotionally aroused in a social situation, a person has to act in an effective and adaptive way to prevent aggressive outbursts (e.g., the General Aggression Model, DeWall et al., 2011). A precondition is that one adequately interprets his or her own body signals associated with (increased) arousal to become aware of one's emotional state, such as while being angry (Mehling et al., 2012, 2018; Price & Hooven, 2018). Terasawa et al. (2013) noted that awareness of one's emotional state involves a balanced integration and interpretation of interoceptive information and the current situation. Gaining interoceptive information is a complex reciprocal and iterative process of sensations, experiences and expectations. Barrett and Simmons (2015) argued that more light has to be shed on the interplay between body signals and the conscious experience of the bodily state, as this might play an important role in this process and will be helpful when handling problems with emotion regulation and psychopathology.

The general sensibility to body signals is called interoceptive awareness (IA) or interoceptive sensitivity (Andersen, 2006; Craig, 2003; Mehling et al., 2018). IA is a key element to identify body signals (i.e., internal physiologic responses) related to affective feeling, and thus forms the base for an integration of bodily sensations, cognitive processes, and emotional feeling (Craig, 2015). It is known that limited IA is related to affective and psychosomatic disorders, possibly as a result of the complexity of the integration and a history of disturbed experiences (e.g., Farb et al., 2015; Khalsa & Lapidus, 2016; Van der Maas et al., 2015). Studies on the efficacy of treatments accentuating IA, including (mindfulness based) body-oriented elements in the approach, have shown a decrease in psychopathology (e.g., Fissler et al., 2016; Wupperman et al., 2009). An emphasis on IA may thus be supportive in enhancing effectiveness of treatments of problem behaviour such as aggressive behaviour. In clinical practice, body-oriented interventions are being used with the aim to increase IA, often in the broader context of emotional regulation (e.g., DuBois et al., 2016; Price & Hooven, 2018; Zwets et al., 2016).

A high level of anger-related arousal is considered to be a risk factor of aggressive behaviour, especially in combination with an impulsive character, because of its undermining effect on cognitive control processes (Olson & Fazio, 2009; Strack & Deutsch, 2004). This kind of arousal can be identified through body signals such as an increased heart rate (e.g., De Looft et al., 2019; Williams, 2017). From a therapeutic point of view, the assumption of awareness of body signals facilitating emotion regulation as formulated by Füstös et al. (2012) is considered important.

At present, there is limited research on topics concerning anger-related IA in individuals with MID-BIF. De Looft et al. (2019) showed that increased arousal levels, signalled by increased skin conductance, heart rate and heart rate variability, precede physical aggressive outbursts in 104 individuals with MID-BIF referred to a forensic treatment setting. In the study by Emck et al. (2012), children with MID-BIF and aggressive behaviour were significantly less aware of their body compared to non-aggressive peers. In line with these results, there is some evidence for body-oriented interventions aiming at decreasing aggression by reducing arousal preceding it (Bellemans et al., 2019; Didden et al., 2019; Singh et al., 2003). In psychomotor therapy, a therapy using physical activity and bodily experiences as cornerstones

of its approach (Emck & Scheffers, 2019), IA is considered to be important when targeting anger and aggressive behaviour in individuals with MID-BIF. As for now, instruments to measure (anger related) IA in this population are lacking (Bellemans et al., 2018).

To measure the awareness of anger-related body signals (i.e., anger-related IA) during anger-provoking social situations, the Anger Bodily Signals Questionnaire (ABSQ) is an instrument for individuals without an intellectual disability (Zwets et al., 2014). This questionnaire consists of 18 statements to be answered on a 5-point Likert-type scale ranging from 1 = "not at all" to 5 = "very much," with low scores indicating low levels of awareness of body signals during anger. A psychometric analysis by Zwets et al. (2014) who investigated the ABSQ in 100 students in secondary vocational education and 70 offenders, a three-factor solution was shown the best fit: the first factor includes items on changes in respiration, heartbeat, body heat and transpiration, the second factor includes items concerning feeling light-headed, shaking and freezing and having a dry mouth, and the third factor includes items on muscle tension and adrenaline. The questionnaire had an excellent internal consistency and good test-retest reliability for the total score. Internal consistency of the sub scales ranged from questionable for factor 2 ( $\alpha = .67$ ) over acceptable for factor 3 ( $\alpha = .73$ ), to excellent for factor 1 ( $\alpha = .90$ ). Test-retest reliability for the sub scales ranged from acceptable (factor 2) to good (factor 1 and 3). Concurrent validity was explored, supporting the ability of the ABSQ to assess the awareness of anger-related body signals.

The ABSQ was developed for individuals with an (above) average IQ. Individuals with MID-BIF might find completing the ABSQ difficult because of their deficiencies in reading and reflective reasoning, which may hamper their ability to fill in this self-report measure (Finlay & Lyons, 2002). Until now, no instruments are available measuring anger-related IA in individuals with MID-BIF. For that reason, the ABSQ was used as a starting point to develop an suitable instrument for measuring IA in individuals with MID-BIF. This study had two goals. First, to adapt the ABSQ for individuals with MID-BIF and evaluate its usability. Second, to evaluate this adapted version of the ABSQ: the ABSQ-id on its psychometric quality (factor structure, internal consistency, test-retest reliability and convergent validity).

## **2 Methods**

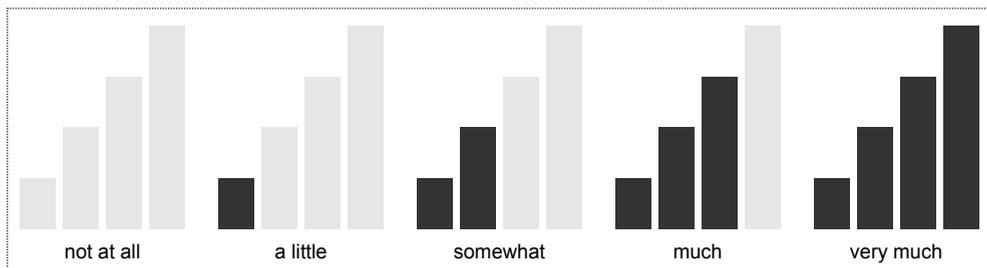
### **2.1 Participants and setting**

This study was carried out in a non-probability sample of 208 adults with MID-BIF, since generating a random sample in this population was not possible in the light of including a sufficient number of participants (e.g., due to clients being somewhat tired of participating in research). All received care and treatment within Dutch facilities for individuals with intellectual disabilities (i.e., Abrona, Ambiq, Avelijn, Frion, de Driesprong, 's Heerenloo, Reinaerde, and Sherpa). The sample included about the same number of males ( $n = 106$ , 51%) and females ( $n = 102$ , 49%) with a mean age of 35.9 years ( $SD = 15.25$ ; range: 18–76 years), and a mean IQ of 63.5 ( $SD = 9.14$ ; range 50–85). Data were obtained from 152 participants with MID (73.1%) and 56 participants with BIF (26.9%). Seventy of the 208 participants had one or more types of comorbidity: genetic disorder (e.g., Prader Willi, Down;  $n = 4$ ), autism spectrum disorder ( $n = 31$ ), psychotic vulnerability ( $n = 6$ ), personality disorder ( $n = 4$ ), ADHD ( $n = 9$ ), anxiety disorder ( $n = 13$ ), attachment problems ( $n = 3$ ), aggressive behavioural problems ( $n = 4$ ).

## 2.2 ABSQ adaptation: From ABSQ to ABSI-id

The ABSQ (Zwets et al., 2014) was adapted in a four-step procedure to better suit individuals with MID-BIF. This four-step procedure was based on previous studies aimed at the development and psychometric evaluation of self-reports for the target group (e.g., the Glasgow Anxiety Scale for individuals with MID (GAS-id) as developed by Mindham and Espie (2003)). In our case, the item pool consisted of items of the ABSQ and in the different steps evaluative information from both an expert therapist working with the target group and from an individual from that group were used.

First, the ABSQ was adapted in line with recommendations for this target group (e.g., Finlay & Lyons, 2002), and in cooperation with a small number of individuals with MID-BIF, in that statements were reformulated, an interview format was chosen instead of a full self-report version, and value judgement free symbols were added to the original 5-point Likert scale so as to visually support the meaning of the scores. Figure 1 presents the visual equivalent to the words of the 5-point Likert scale.



**Figure 1.** *The visual equivalent to the words of the 5-point Likert scale.*

In the second step, a trial assessment (pilot study) with other individuals with MID-BIF ( $n = 30$ ) took place and together alternatives per statement were formulated. In addition, an introduction was added to help focus on concrete situations when feeling angry before answering the questions. During the third step of the adaptation process, a qualitative assessment took place based on the experiences with a large group of participants. This led to the version without ambiguous items, a version that was used for the psychometric investigation, that formed the fourth step in this study. Based on the results of these statistical analyses with a focus on psychometrics, the final version of the adapted instrument: the “Anger Bodily Sensations Interview – intellectual disabilities” (ABSI-id) was formalized. See Appendix for the adaptations made in the four-step procedure. The current paper reports on the last two steps: qualitative assessment and psychometric statistical analysis, respectively.

## 2.3 Procedure

This study was approved by the Ethics Committee of the Faculty of Social Sciences (ECSS) of the Radboud University (ECSW2017-005R3). The research committees or care managers of the participating facilities for individuals with intellectual disabilities gave permission to collect data at their organisation. Participants who met the inclusion criteria (18 years of age or older and IQ between 50 and 85) were individually approached by a research assistant and were invited for an information meeting. These meetings took place on the ward. The clients who lived there were informed and/or individual clients who asked to be informed as they heard from the study by one of the other clients. During the meeting, clients received

information on the research topic, the voluntary nature of participation and anonymous processing of the data. Those who agreed to participate were asked to sign an informed consent form, and when necessary also their legal representative was asked to sign the informed consent form. We did not gather information on non-responders. For the qualitative assessment, comments on ambiguity of statements given by the participants during the actual interview were noted in a memo. These comments were discussed with three experts (two psychomotor therapists and one psychologist), all having extensive experience in working with clients with MID-BIF. When agreement occurred as to the ambiguity of a statement, this item was excluded from the psychometric statistical analysis. In order to assess test-retest reliability, the interviews were conducted twice with an interval of one to two weeks.

## **2.4 Data analyses**

We used IBM SPSS Statistics (Version 20.0) to conduct the analyses on the psychometric quality based on the version of the instrument that resulted after the third step in the adaptation process, the qualitative assessment. First, the normal distribution of the items was examined. When skewness and kurtosis scores were outside the range  $-1$  and  $1$ , items were eliminated because too much deviation from normality may restrict the quantitative analysis (Field, 2018). Then, test-retest reliability per item was calculated. Items with an intra class correlations coefficient (ICC) and a Pearson Correlation coefficient ( $r$ ) lower than  $.40$  were deleted from the item pool (Cicchetti, 1994). Then, sampling adequacy and the correlations between the items were verified by Kaiser-Meyer-Olkin measure and by Bartlett's test of sphericity, respectively. Next, an exploratory factor analysis (EFA), using principal axis factoring (PAF), was conducted to identify possible subscales of the ABSQ-id collected data at the first assessment. We removed items with factor loadings  $< |0.30|$  and cross loadings (items loading on more than one factor with a discrepancy  $< |0.20|$ ). Based on the factor structure found, a confirmative factor analysis (CFA), using Mplus version 5.1 (Muthén & Muthén, 2008) was performed on the same data set to test the fit of the obtained factor model. Goodness of fit was evaluated by means of different fit indices: Comparative Fit Index and Tucker Lewis Index (CFI and TLI; Bentler, 1990). The CFI and TLI compare the sample covariance matrix with a null model of uncorrelated latent variables. CFI and TLI values between  $.90$  and  $.95$  suggest an acceptable model fit, and values exceeding  $.95$  suggest a good fit (Browne, 2015). The normed chi square, the ratio of  $\chi^2 / df$ , less than  $2$  would represent an adequate model fit (Tabachnick & Fidell, 2007). The Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993) represents the fit of the estimated covariance matrix to the populations covariance matrix. RMSEA values less than  $.08$  indicate adequate model fit, whereas values below  $.05$  indicate good model fit (Browne & Cudeck, 1993). The Standardised Root Mean square Residual (SRMR; Schermelleh-Engel et al., 2003) is the standardised square root of the difference between the residuals of the covariance matrix of the sample and the hypothesised covariance model. SRMR values between  $.05$  and  $.10$  suggest an acceptable fit and values less than  $.05$  suggest good fit (Schermelleh-Engel et al., 2003).

The analyses as described led to the instrument in its definite form. Further examination included an assessment with Cronbach's  $\alpha$  and McDonalds  $\omega$  calculated for the internal consistency of the 9-item ABSI-id (both the total scale and the subscales) using the first assessment from all respondents. Cronbach's  $\alpha$  was considered acceptable between  $.70$  and  $.79$ , and good between  $.80$  and  $.89$  (Cicchetti, 1994). These criteria were also applied to McDonalds  $\omega$  (Simsek & Noyan, 2013). Data on both test and retest were available in 91.8% of the participants ( $n = 191$ ) and the stability over time of the total score and subscales

were calculated by ICC and the Pearson correlation ( $r$ ). Test –retest reliability values were assessed as follows:  $< .5$  poor, between  $.5$  and  $.75$  moderate, between  $.75$  and  $.9$  good, and  $> .90$  excellent (Koo & Li, 2016). With no instrument available that could be used as a golden standard, the Construct Reliability (CR) and the Average Variance Extracted (AVE) were calculated based on the Fornell-Larcker criterion, to examine convergent validity. AVE greater than  $0.5$  shows acceptable convergent validity, above  $0.7$  very good and CR above  $0.7$  is acceptable (Cheung & Wang, 2017). To explore the difference in scores between individuals with MID and those with BIF independent t-tests were used.

### 3 Results

#### 3.1 Qualitative assessment (step 3 in adaptation process)

The average administration time for the total of 18 items was 10–15 min. Six items were deleted as they had initially more than 10% of non-responses. These items were difficult to answer in forty-two of the participants (9 BID, 33 MID) and were therefore further analysed on comprehension. A recurring comment of the participants during the interview was that four items (“My body freezes / becomes stiffened,” “My body starts shaking / trembling,” “My hands starts shaking / trembling,” “I get a dry mouth / I get less spit”) were not only difficult but also perceived by the participants as not relevant. Some items were mainly associated with being cold, namely “My body starts shaking / trembling” ( $n = 32$ , 15.38% initially non-response) and “My hands starts shaking / trembling” ( $n = 42$ , 20.19% initially non-response). The latter item was also often related to being afraid or nervous and not specifically to being angry. Clients related the item referring to “A dry mouth” to being thirsty ( $n = 39$ , 18.75% initially nonresponse). Associations with being frightened or being scared were mentioned as a reaction on the following item: “My body freezes / becomes stiffened” ( $n = 21$ , 10.18% initially non-response). Finally, two other items were difficult to answer as their original formulation was regarded as too abstract and needed much more additional information or explanation of the terms used: “I get an adrenaline kick, or I feel a rush of energy through my body” ( $n = 35$ , 16.83% initially non response), and “I get light-headed or I get dizzy” ( $n = 28$ , 13.46% initially non response). In the light of a concrete formulation of body signals, one participant mentioned that if body signals could not be pointed out, or that it could not be visualised in a cartoon (as hot headed or as a container under pressure), he was unable to feel these body signals or be aware of them. Figure 2 presents some remarks of the participants in response to the above mentioned six deleted items.

“I only shiver when feeling cold. That has nothing to do with feeling angry!”

“When my hands tremble, I’m or cold or nervous.” “How does that feel? ... Adrenaline!?!...”  
[participant looks at the research assistant and makes a gesture with his arms accentuating that he does not know its meaning]

“A dry mouth... than I know I have to ask for a cup of coffee. That is a sign of being thirsty.”  
[participant chortles]

“I only freeze when I’m terrified.”

“Lightheaded... that’s strange... [participant rolls his eyes] my head is quiet heavy. [a moment of silence] And I get dizzy when I have a flu.”

**Figure 2.** Citations of participants’ remarks with regard to six items being difficult to understand and were thus deleted (in step 3).

Elimination of these six items led to an instrument of twelve items (see step 3 in Appendix) that formed the starting point for psychometric statistical examination.

### 3.2 Psychometric statistical analyses (step 4 in the adaptation process)

#### 3.2.1 Factor structure

Of the twelve items of the questionnaire that remained following the qualitative assessment in step three, no items were removed based on the test-retest reliability (all ICCs and  $r_s > 0.4$ ).

The Kaiser-Meyer-Olkin test indicated that the sample of 208 participants was sufficient for an EFA based on scores on twelve items, with a sampling adequacy of .84. The Barlett's test of sphericity,  $\chi^2(55) = 821,551$ ,  $p < .001$ , showed that the correlations between items were sufficiently large for the EFA. A PAF analysis revealed two factors based on eigen values and the scree plot. The two-factor solution, using Oblimin rotation due to correlation between the factors (i.e.,  $r = .59$ ), was the most readily interpretable from a clinical and empirical standpoint and was therefore further explored. Then, one item ("My jaw muscles become tense / I grind my teeth") was deleted due to low communality (0.11). Two cross-loading items were excluded ("My hands start sweating / transpiring more" and "My muscles become tensioned/ contracted"). This resulted in the final 9-item version of the instrument, now called the Anger Bodily Sensations Interview – intellectual disabilities (ABSId-id) (see step 4 in Appendix).

The two factors in the ABSId-id explained 58.36% of the total variance. The percentage of variance explained by each factor was 43.53 and 14.84 and the eigenvalues of the factors 3.92 and 1.34, for the factors one and two, respectively. The factor correlation ( $r$ ) was .53. Factor 1 [items 1, 2, 4, 7, 8, 9], was labelled as the activity subscale and contained items on shifts in heartbeat, respiration and muscle activity. Factor 2 [items 3, 5, 6], was labelled as the body heat subscale and included items on shifts in body temperature and transpiration. Table 1 presents the mean scores per item as well as the factor loadings.

**Table 1.** Factor loading for adapted instrument (n = 208).

ABSId-id statements and item numbers	Item scores		Factor	
	Mean	SD	1	2
4. My breathing becomes faster / goes more frequent	2.24	1.26	<b>.75</b>	.01
2. My breathing becomes irregular / goes fast then slow	2.20	1.21	<b>.72</b>	.02
1. My heart starts beating faster / starts beating more frequent	2.62	1.36	<b>.69</b>	-.06
8. My breathing becomes deeper / I take a lot of air in my lungs	1.99	1.25	<b>.66</b>	-.05
7. My heart starts beating harder / starts pounding	2.54	1.36	<b>.66</b>	.06
9. I clench my fists / I squeeze my hands	2.11	1.42	<b>.39</b>	.10
6. My body starts feeling warmer / starts feeling hot	2.26	1.26	-.14	<b>.98</b>
5. I start sweating more / start transpiring more	2.18	1.32	.15	<b>.65</b>
3. My head starts feeling warmer / starts feeling hot	2.31	1.32	.08	<b>.55</b>

Skewness and kurtosis for the total scale as well as for the subscales met the criteria of normal distribution as all scores were between -1 and 1 (Hair et al., 2017).

A CFA of the two-factor structure including 9 items was performed in the same sample. An adequate model fit was found with a normed chi-square of 1.78, a CFI of .94, a TLI of .92, a RMSEA of .061 (CI90 = .031-.090) and a SRMR of .046.

### 3.2.2 Internal consistency of the ABSI-id

Cronbach's Alpha of the total ABSI-id was good, that is .81. Alpha values for the two subscales activity and body heat were .81 and .77, respectively.

McDonald's Omega was .84 for the total ABSI-id. And Omega values were .82 for subscale activity and .79 for subscale body heat.

Internal consistency was considered good for the total scale and subscale activity and moderate for subscale body heat based on both Cronbach's Alpha and McDonald's Omega (Koo & Li, 2016; Simsek & Noyan, 2013).

### 3.2.3 Test-retest reliability of the ABSI-id

ICC on the total scores of the ABSQ-id between test and retest were .80 for the total score, and .71 and .80, for the subscale activity and for subscale body heat, respectively. Pearson correlations ( $r$ ) were .80 for the total score and .72 for activity, and .80 for body heat. So, test-retest reliability was good for both the total scale as well as for subscale body heat, and moderate for subscale activity (Dancey & Reidy, 2007).

### 3.2.4 Convergent validity

Construct reliability was 0.77 and AVE was 0.68. The convergent validity of the ABSI-id was considered adequate based on the Fornell & Larkell criteria (see Cheung & Wang, 2017).

### 3.3 ABSI-id: Difference between individuals with MID and those with BIF

The mean total ABSI-id score was not significantly different for individuals with MID compared to those with BIF ( $t(206) = -1.71, p = .089$ ; see Table 2). There were also no significant differences in the mean scores on the two subscales activity and subscale body heat between the two groups ( $t(206) = -1.51, p = .13$  and  $t(206) = -1.43, p = .15$ , respectively). Table 2 presents the mean scores for the total scale and the subscales of the ABSQ-id.

**Table 2.** Mean total scores and mean subscale scores of the ABSI-id for individuals with MID and individuals with BIF.

	MID ( $n = 156$ )		BIF ( $n = 53$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Total score ABSI-id	19.89	7.60	21.93	7.82
Subscale activity	13.33	5.53	14.65	5.58
Subscale body heat	6.56	3.20	7.28	3.30

Note: ABSI-id = Anger Bodily Sensations Interview for individuals with intellectual disabilities; total score ABSI-id ranging from 9 to 45, subscale score activity ranging from 6 to 30, subscale score body heat ranging from 3 to 15.

## 4 Discussion

In this study, a 9-item adapted instrument was explored that aims to measure anger-related IA in individuals with MID-BIF. This instrument originated from an adaptation of the 18 items of the ABSQ. Adaptations were done based on both qualitative assessment with participants from the target group and a quantitative statistical analyses. The qualitative analysis led to the shift from questionnaire into an interview, the addition of an introduction, symbols to visually support the meaning of the Likert scales, extra examples, and six items that were most often misinterpreted by individuals with MID-BIF were deleted. During the psychometric statistical analysis, one item was deleted due to low communality, while two cross-loading items were deleted. The EFA and CFA with data from 208 participants revealed two subscales: the activity subscale, including six items on heartbeat, respiratory and muscle tension, and the body heat subscale, including three items on body temperature and transpiration. Internal consistency and test-retest reliability of the instrument were moderate to good (Koo & Li, 2016; Simsek & Noyan, 2013). These findings are generally in line with the results regarding the reliability of the ABSQ as applied in individuals without MID-BIF (Zwets et al., 2014). The convergent validity was acceptable. The total score and subscale scores of the ABSI-id showed no significant differences between individuals with MID and those with BIF. A strength of this study is that, with this short instrument specifically adapted for individuals with MID-BIF, a need is met as there is a lack of reliable and valid instruments measuring IA. This is an important gap in de literature, as identified by for instance Khoury et al. (2018) and Mehling et al. (2012). Several limitations of our study should also be mentioned as well as additional areas for future research. First, this study focused on a range of psychometric characteristics of the ABSI-id, including factor analysis, internal consistency, test-retest reliability and a first indication of convergent validity, based on data from more than 200 participants, however, a CFA was conducted in the same sample and the ABSI-id was not compared to another instrument. In future research, emphasis should be given to further consolidation of the instrument a CFA is necessary to be conducted in a different sample, as it often shows an adequate fit when done in the same sample. Besides that, the validation of the instrument needs further investigation. As no golden standard exists, the association between the ABSI-id with other measures of anger-related IA should be explored. In this light, it should be noted that subjective experiences, measured by self-report as in the ABSI-id, reflect another dimension of interoception than objective measurements like heartrate or skin conductance (see e.g., De Looff et al., 2019). Research on the correlation between these two dimensions is needed (Ferentzi et al., 2017; Garfinkel et al., 2015). A possible strategy to do this and also to validate the ABSI-id would be to compare the subjective outcomes of the ABSI-id with data from both objective sources and information from interviews. Preferable this should be done in controlled situations that normally evoke anger.

Second, it should be mentioned that based on the normal distribution of IQ, prevalence of BIF is higher than MID, while in the current study individuals with MID were overrepresented. According to the Dutch clinical practice, in this study individuals with MID and those with BIF are considered as a single group based on their similarities concerning deficiencies in adaptive functioning and associated support needs (Woittiez et al., 2014; Woittiez et al., 2019). The overrepresentation of individuals with MID could have consequences for the (further) instrument development. The adaptations made to this instrument, fitted to the needs of a sample of merely individuals with MID. Assuming that individuals with more cognitive skills (individuals with BIF) would also not have problems in understanding the items. Future research should elaborate on this issue and not only explore differences between groups but also conduct a multiple group CFA to see whether the total scale and subscales are comparable in both groups.

With regard to clinical practice, the present data suggest that the ABSI-id has good potential for further examination in the light of assessing awareness of anger-related body signals. Future research should however focus on (construct) validity and the scale's sensitivity to change. Such information should indicate whether this instrument might be a valid instrument for diagnostic and evaluation purposes to identify the awareness of specific shifts in body signals when being angry. Especially for body-oriented therapies such an instrument may be helpful in enabling clinicians to adequately refer individuals to mind–body interventions. Especially for body and movement-oriented therapies, such as psychomotor therapy (PMT), such an instrument may be helpful in enabling clinicians to adequately refer individuals to mind–body interventions. As described in the so-called Somatic Marker Hypothesis (Damasio, 1996), body signals may have an important function in guiding emotional and behavioural reactions. In the light of this, further research is needed to provide insight in their relation with aggressive behaviour in individuals with MID-BIF.

When the instrument has shown sensitivity to change, it can be also useful in the evaluation of efficacy of therapies aiming at improving IA in individuals with MID-BIF. This said, it should be noted though that there are limitations associated with the use of self-reports especially when explicit treatment goals are (too) congruent with the outcome measures. As mentioned by Mehling et al. (2018), using these kind of self-reports can distort the outcomes in a positive way as they resemble what people are told to be learning in therapy. Instead of showing real change, the outcomes could then possibly merely echo these new ways of expressing oneself.

## **5 Conclusion**

The ABSI-id is a promising instrument for measuring anger-related IA in research and clinical settings for individuals with MID-BIF. Further research, both cross-sectional and longitudinal studies, could help gain additional information on the validity of both the total scale and the subscales, its sensitivity to change and to test the assumptions of IA and its relation with aggression.



# CHAPTER 6

## General discussion





## **1 Introduction**

This chapter synthesises the main findings of the studies presented in this dissertation, which focused on the contribution of psychomotor therapy (PMT) in addressing anger regulation problems and aggressive behaviour in people with mild intellectual disabilities or borderline intellectual functioning (MID-BIF). At present, there is a lack of scientific knowledge about the assumed working mechanisms and the effectiveness of PMT interventions, especially in the above-mentioned target group. In this dissertation, research questions focused on PMT in terms of diagnostics as well as the treatment of anger regulation problems and aggressive behaviour in people with MID-BIF (see also Chapter 1). This dissertation concentrated on the efficacy of interventions as applied in PMT, the content of the applied PMT programme and the assumed mechanism of action, clients' experiences with PMT and finally the adaptation of an instrument for measuring interoceptive awareness. The following sections present brief summaries of Chapters 2 to 5 and discuss key findings, followed by considerations regarding clinical implications, future developments and future research. This general Discussion section ends with a reflection on the research study's strengths and limitations.

## **2 Short summary of chapters**

Chapter 2 presented a systematic review. This overview of the state of the art aimed to inform clinicians on the efficacy and research basis of both body-oriented and movement-oriented interventions targeting anger regulation problems and/or aggressive behaviour in people with MID-BIF. From this systematic review, it may be concluded that body-oriented interventions, including progressive muscle relaxation and bodily oriented mindfulness interventions, are promising interventions to decrease aggressive behaviour in individuals with MID-BIF.

Chapter 3 presented information obtained through interviews held with seventeen Dutch psychomotor therapists about the theoretical basis, content and coherence of the psychomotor programmes as applied in this population. Increasing interoceptive awareness (IA; becoming conscious of anger-related body signals) and strengthening adaptive coping skills were mentioned as key elements in the psychomotor treatment programmes. However, the theoretical background information that therapists provided was limited, especially with respect to IA. Furthermore, as valid and reliable instruments for evaluating interventions were unavailable, evaluation instruments were only used to a limited extent.

Chapter 4 described the experiences of clients with MID-BIF who received PMT for their anger regulation problems or aggressive behaviour. This study aimed to explore the assumed PMT mechanisms of action and perceived outcomes. According to the clients involved, increasing IA and adaptive coping skills were the main goals. The participants also stressed the possibility of learning by doing and the therapeutic alliance as key elements. As a result of their treatment, participants perceived a reduction of aggressive outbursts as well as an increased interoceptive awareness and adaptive coping skills. This subsequently led to an improvement of self-control, self-efficacy and self-esteem.

Chapter 5 reported the psychometric properties of an adapted IA measurement instrument in 208 people with MID-BIF. In close cooperation with individuals from the target group, the Anger Bodily Sensations Interview - intellectual disability (ABSI-id) was developed. The ABSI-id consists of 9 items, and an exploratory factor analysis revealed two subscales: activity and body heat. Confirmatory factor analysis on the same sample showed an acceptable fit for the two factor structure. Reliability of the ABSI-id was

good. Convergent validity was acceptable. This study showed that the ABSI-id is a feasible instrument for measuring anger-related IA in people with MID-BIF for use in research settings as well as in clinical practice.

### **3 Key findings, clinical implications and future developments**

This section highlights two key findings from the main results reported in this dissertation. These are discussed below and integrated with knowledge from research and clinical practice. Further implications, developments for PMT and future directions for research are also discussed.

#### **3.1 Key finding one: Increased anger-related IA is one of the mechanisms of action in body-oriented and movement-oriented interventions targeting anger regulation problems and aggressive behaviour.**

##### *3.1.1 Research on mechanisms of action in body-oriented and movement-oriented interventions*

In the past decades and from different perspectives, attempts have been made to examine efficacy and to understand the mechanism underpinning the effects of treatments that use a mixture of body-oriented and movement-oriented interventions (e.g., Buric, Farias, Jong, Mee, & Brazil, 2017; Shapiro et al., 2006). The findings in this dissertation can be placed at the boundaries of psychological and physiological insights on PMT.

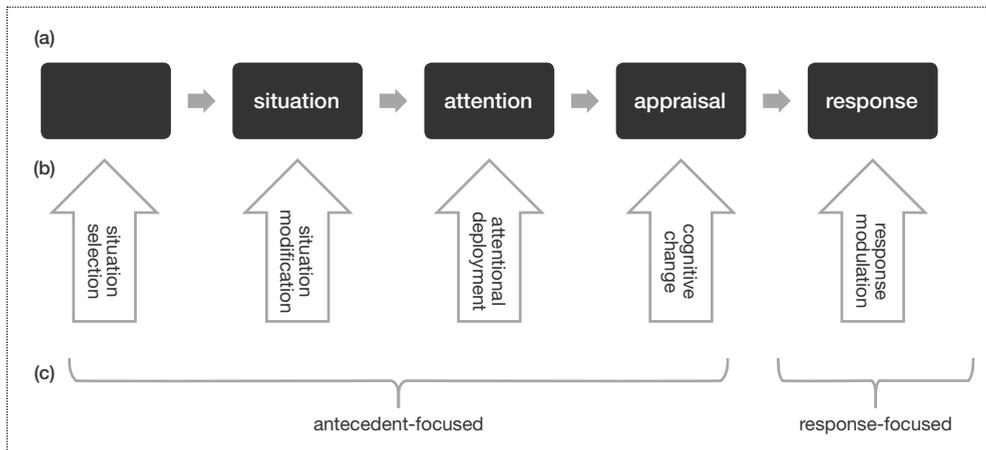
Gratz and Roemer (2004) suggest that in order to prevent aggressive behaviour, people must be able to respond appropriately when angry. This means that, as a precondition, people should be able to recognise their anger. An adequate interpretation of one's own body signals associated with (increased) physiological arousal is generally seen as necessary to become aware of one's emotional state, for instance while being angry (Füstös, Gramann, Herbert, & Pollatos, 2012; Mehling et al., 2012; 2018; Price & Hooven, 2018). There is, however, an important difference between the ability to accurately perceive body signals (i.e., interoceptive accuracy) and the conscious perception of sensation from inside the body related to an emotion (i.e., IA) (Cali et al., 2015). This means, for example, that cardiac interoceptive awareness is not reflected in the sensorial accuracy in perceiving one's own cardiac signals; instead, awareness of a changed heart rate due to anger might help to recognise anger.

##### *3.1.2 Focus on the awareness of body signals*

Prior to the publication of this dissertation, research only implicitly referred to the awareness of body signals in people with MID-BIF for recognising growing tension or anger. For example, in their recent study, Gray, Beech and Rose (2019) applied a biofeedback intervention in sexual offenders with MID that was aimed at emotional regulation. In this study, the researchers used a physiological measurement (i.e., heart coherence) and a questionnaire for emotion dysregulation. Body signals were used as a source of information on increased tension as well as on increased emotions, and the body was used to down-regulate arousal. However, the question as to whether participants were actually aware of body signals related to this arousal was not included in the intervention, nor was this measured.

Becoming aware of body signals and down-regulating arousal by using the body, two main aims of PMT, can be connected to the "process model of emotion regulation" as described by Gross

(1998; Gross & Thompson, 2007). This model suggests that emotion (such as anger) increases in intensity through a consecutive situation – attention – appraisal – response sequence. In such a sequence, an individual experiences a situation, attends to this situation and then interprets the situation (see Figure 1.) This results in a pattern of changes in experiential, behavioural and physiological responses. The model includes a total of five emotion regulation categories that can be distinguished based on the moment in the process at which they exert their impact. Antecedent-focused strategies start before response tendencies are activated, and response-focused strategies start later, after the emotion response tendencies are fully activated (see Figure 1).



**Figure 1.** The process model of emotion regulation (adapted from Gross, & Thomson, 2007).  
 (a) Components of emotion generation. (b) Five emotion regulation categories.  
 (c) Antecedent-focused versus response-focused emotion regulation strategies.

PMT is expected to have an influence on situation modification, attentional deployment and response-focused emotion regulation (see Figure 1) by using relaxation techniques such as time to relax, by focusing on body signals and by using relaxation and movement as down-regulation strategies, respectively. The role of (anger-related) IA, being aware of body signals associated with emotions, is not explicitly described in this model; however, being aware of body signals might help an individual to respond in an earlier stage of the process of increasing anger and thus enhance the prevention of aggressive behaviour. Indeed, Price and Hooven (2018) state that IA (including identifying, accessing and appraising internal body signals) is identified in physiological models as a key component of interoception for emotion regulation. The development of skills that improve sensory (physical and emotional) awareness reduces (bodily and emotional) distress and improves regulation. In other words, IA may prevent aggressive behaviour as it enables a person to intervene before the actual response (aggressive behaviour) takes place. Anger-related IA thus seems to be a crucial element. First, when an individual is aware of body signals while angry, the body can be used as an information source to recognise increasing anger through changes in body signals (e.g., sweating, an increasing heart rate or breathing). Second, when one is aware that one is angry, the body can be used as a tool to down-regulate the increased bodily tension (e.g., by means of breathing exercises). In line with the latter, qualitative studies on (body-oriented) mindfulness interventions have shown that the direct experience of mindfulness meditation positively influences the understanding of down-regulation (Chapman & Mitchell, 2013; Currie, McKenzie, & Noone, 2019; Griffith et al., 2019).

### *3.1.3 Increasing anger-related IA as a mechanism of action*

It has been suggested that the improvement of IA is a key mechanism of action for many body-oriented and movement-oriented therapies (Mehling et al., 2011, 2020). Limited IA is shown to be related to somatoform or affective disorders, possibly as a result of a history of disturbed experiences and the complexity of their integration (see Farb et al., 2015; Khalsa & Lapidus, 2016; Van der Maas et al., 2015). These experiences may lead to a distance to one's own body and, in extreme cases, to dissociation. This might be caused by dysregulations in the stress response systems, initially reflected by hyper-responsivity. The stress response system might become less sensitive and responsive to cues over time. As a result, it becomes insensitive to internal states, which in turn affects the relationship with the body and emotions. In this way, stress, which is often present in people with MID-BIF, affects not only an individual's sensitivity to body signals, but also the interpretation of body signals related to emotions and responses to emotions (see Schulz & Vogege, 2015). Therefore, it can be argued that deficiencies in emotion regulation (leading to aggressive behaviour) stem from a disturbed IA.

Studies on the efficacy of body-oriented treatments that are focused on IA have shown beneficial results for depressive symptoms (Fissler et al., 2016) and trauma (Langmuir, Kirsh, & Classen, 2012). Other studies have reported the effectiveness of PMT-like interventions for people with, for instance, substance abuse (Nakamura et al., 2015; Price et al., 2019; 2020). In clinical practice, body-oriented and movement-oriented interventions are used with the aim to increase IA, often in the broader context of emotional regulation (see Price & Hooven, 2018; Zwets et al., 2016).

So far, only Zwets and colleagues (2014, 2016) have paid specific attention to anger-related IA in terms of diagnostics and treatment effect. We elaborated on this in the studies included in this dissertation. Based on the findings reported here, a focus not only on IA in general but especially on anger-related IA enhances the effectiveness of treatments for problem behaviour such as aggressive behaviour. Anger-related IA can thus be seen as a mechanism of action in interventions targeted at aggressive behaviour by working with and through the body.

### *3.1.4 Empirical foundation of anger-related IA*

In order to strengthen the empirical foundation of anger-related IA in the light of anger regulation and the prevention of aggressive behaviour and in order to give theoretical support for the two subscales in the ABSI-id (Chapter 5), the role of the (para)sympathetic nervous system should be noted. Empirical studies, for instance the study by de Looff, Didden, Embregts and Nijman (2019), often measure skin conductance and heart rate in relation to aggressive behaviour. Skin conductance reflects the sympathetic influence on the eccrine system and is closely linked to body heat and perspiration. One's heart rate (variability) is affected by sympathetic as well as parasympathetic influences. The two subscales of the ABSI-id reflect this distinction: the subscale 'body heat' and the subscale 'activity' are related to the sympathetic nervous system and the sympathetic and parasympathetic nervous systems, respectively.

Being aware of anger-related body signals thus seems to be an important indicator or information source, similar to a barometer – an indicator of, for instance, an increased heart rate during a period of growing bodily tension or emotion that precedes the expression of aggressive behaviour. This is in line with findings reported in a study by de Looff et al. (2019), who showed that physiological arousal increases 30 minutes before an aggressive outburst in people with MID-BIF. In order to regulate this stacking process of increasing bodily tension (e.g., heart rate and skin conductance) prior to an incident that involves

aggressive behaviour, both attention to such bodily processes and awareness of one's emotional state are important (Kever, Pollatos, Vermeulen, & Grynberg, 2015; Price & Hooven, 2018). Anger-related IA thus appears to be crucial for recognising growing tension and anger, particularly in terms of the down-regulation of arousal (and the associated emotion, namely anger). As such, it is important for preventing aggressive behaviour.

### *3.1.5 Avenues for future developments in clinical practice and research*

When it comes to making individuals aware of body signals, future PMT treatment forms could profit from the use of "technical" innovations such as biofeedback devices. In view of increased levels of physiological arousal prior to an aggressive outburst (de Looft et al., 2019), biofeedback obtained via wearables may prove to be an effective additional tool. During therapy sessions (and in daily life), such wearable devices could be used to provide concrete (visual) information to help individuals focus their attention more clearly on their body signals. Many applications have already become available that make use of biofeedback on breathing and heart rate with the aim to down-regulate stress in people without ID (e.g., Kennedy & Parker, 2019). Biofeedback is also gaining interest for the benefit of individuals with intellectual disabilities, particularly with respect to emotional regulation in sexual offenders (Gray, Beech, & Rose, 2019). Combining these kinds of applications in PMT treatment may reinforce an individual's awareness of shifts in body signals (also in daily life) and may thus be beneficial for general application.

Biofeedback devices could also be used in future research to further validate the ABSI-id. Test situations may be created to measure IA which include tension-raising exercises in PMT. Anger-related IA could then be measured, for instance, with physiological tests such as skin conductance and heart rate or heart rate variability (HRV). In addition, a subjective measurement of increasing bodily tension, for example through the use of a tension thermometer, could be selected besides the ABSI-id (retrospective on that situation). Future research could thus focus on both objective and subjective measurements of interoception (interoceptive accuracy and interoceptive awareness) in the light of anger regulation. A mixed method approach including the ABSI-id, an objective measurement and a qualitative measurement is appropriate since these elements will likely generate complementary information on the issue concerned, as was found in a study conducted by Zamariola and colleagues (2019).

### **3.2 Key finding two: Elements of PMT are suitable and promising in the treatment of people with MID-BIF and anger regulation problems and/or aggressive behaviour.**

PMT has been shown to be effective for both general mental and physical health outcomes in several populations (Boerhout et al., 2017; Priebe et al., 2016; van der Maas et al., 2016). PMT targeted at anger regulation problems and aggressive behaviour has already proven to be effective in people with eating disorders (Boerhout et al., 2016, 2017), people with dementia (see Verkaik, van Weert, & Francke, 2005) and people in forensic settings (Zwets et al., 2016). The contribution of PMT targeting this problem in individuals with MID-BIF was explored in the studies included in this dissertation.

### *3.2.1 Efficacy of body-oriented interventions for people with MID-BIF and anger-related problems and/or aggressive behaviour*

As far as individuals with MID-BIF are concerned, the systematic review (Chapter 2) revealed that progressive relaxation and a mindfulness intervention that is concentrated on a neutral body part (i.e., Soles of the Feet; see Singh et al., 2003) can lead to a decrease in aggressive behaviour. In line with the results of our systematic review, a more recent study by Roberts et al. (2020) presents findings in favour of a body-oriented (mindfulness) intervention in people with MID-BIF who demonstrate aggressive behaviour.

Both the systematic review and this additional study indicate that body-oriented PMT interventions contribute to a reduction of aggressive behaviour as a result of down-regulating bodily tension. In line with this focus on the down-regulation of bodily tension, Hartley and MacLean (2008) made a plea for the use of breathing exercises (as a body-oriented intervention) as this type of coping does not require complex metacognitive skills and may therefore be a useful strategy for adults with MID-BIF. This was also confirmed by Parent, Birtwell, Lambright and Dubard (2016) and by Laborde, Allen, Göhring and Dosseville (2017): they suggested that youngsters with developmental disabilities could benefit from breathing techniques in order to deal with everyday stressors.

### *3.2.2 Efficacy of movement-oriented interventions for people with MID-BIF and anger-related problems and/or aggressive behaviour*

The actual scientific state of the art as far as anger-related problems for people with MID-BIF are concerned, as presented in Chapter 2, does not include movement-oriented methods and techniques. However, in other populations, such as people with severe intellectual disabilities or pervasive developmental disorders, these interventions have been shown to be effective (see Lang et al., 2010; Ogg-Groenendaal, Hermans, & Claessens, 2014). In Dutch PMT practice, the body-oriented interventions as described in the studies included in the systematic review (for instance relaxation techniques) and movement-oriented interventions are intertwined (see Emck & Scheffers, 2019), but no international studies on such combinations were found. The review thus suggests that working with and through the body is valuable in decreasing aggressive behaviour, but whether and how PMT contributes to a decrease of aggressive behaviour remains unknown from an empirical point of view.

### *3.2.3 Client experiences and psychomotor therapists' experiences of the mixture of both body-oriented and movement-oriented interventions*

In international scientific research, attention for the combination of the two kinds of interventions (body-oriented and movement-oriented) is lacking. In practice, however, the mixed approach is often applied and perceived to be useful, not only by Dutch psychomotor therapists (Chapter 3) but also by clients (Chapter 4). Both groups mentioned the value of body-oriented and movement-oriented techniques and methods. Especially activities in which these two elements were fused (e.g., by focusing on body signals during a movement activity) were considered valuable by both experts and clients. During such activities, the psychomotor therapist creates a 'playground' in which the client becomes aroused as a result of the activity (e.g., balancing on height). Opportunities are then created to practise down-regulation skills or other adaptive coping skills. The explicit focus on body signals to become aware of anger and practising with both concrete bodily tools to down-regulate anger and other adaptive coping skills in a sports and movement context make PMT suitable for individuals with MID-BIF (Chapman et al., 2013; Kay, Clegg, Emck, & Standen, 2016).

### *3.2.4 Towards a newly developed PMT programme for people with MID-BIF and anger-regulation problems and/or aggressive behaviour*

Based on the findings reported in this dissertation, a PMT programme has been outlined including conditions for PMT and practice-based elements (Bellemans & Burger, submitted). In this programme, three therapy stages can be distinguished. At the start, the main focus lies on increasing awareness of bodily tension, for instance during “sitting” against a wall with knees bent 90°, and on becoming aware of how the body feels when relaxed, for example after breathing exercises. In the second stage, the emphasis changes to increasing awareness of bodily signals while there are changes in the level of arousal. To this end, arousal is increased by manipulating the movement context, for instance during an obstacle race. Arousal is then down-regulated, for instance by using the breathing exercises that were completed in phase one. In the third phase, the social context is manipulated, for example during a match or a game, and the client is asked to become aware of the bodily tension while being aroused. The client then learns how to down-regulate bodily tension in this kind of situation. In this programme, special attention is given to the additional context in which a stressor can be experienced; the client is then given the opportunity to practise with this kind of stressor (through actively evoking a response in the here-and-now) and, on the other hand, to focus on the body and the information provided by the body. The latter is mentioned by clients as well as psychomotor therapists, as discussed in Chapters 3 and 4, respectively. This way of working creates the opportunity for clients to link IA and adaptive coping skills (see also Key finding one).

### *3.2.5 Technical innovations to support PMT*

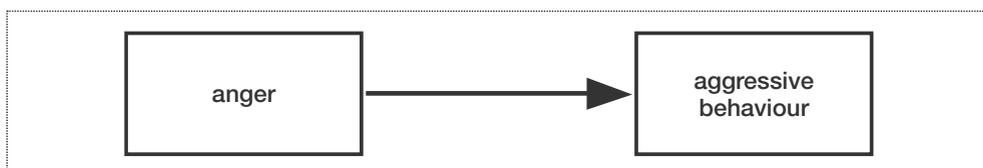
As argued above, PMT as a precondition for down-regulating anger helps clients to focus on the relevant bodily information and to recognise their anger. Focusing on relevant information, which is often a problem in individuals with MID-BIF, facilitates transfer and generalisation (Alberto & Troutmen, 2009). As a result of repetitive practice in various movement contexts, generalisation in daily life is enhanced. Embedding virtual reality (VR) as a tool in PMT could also enhance the generalisation process of PMT to daily life. At present, there are several initiatives to implement VR in art therapy (Hacmun, Regev, & Salomon, 2018; Kaimal, Carroll-Haskins, Berberian, Dougherty, Carlton, & Ramakrishnan, 2020). As a form of biofeedback, VR tools can also be used in PMT (see also technical innovations in Key finding one). It has already been shown that relaxation and breathing exercises can benefit from VR (Blum, Rockstroh, & Görts, 2020; Van Rooij, Lobel, Harris, Smit, & Granic, 2016). VR is then directly connected to the medium of the therapy. However, to our knowledge VR has not yet been implemented to help clients generalise the skills they acquired in PMT settings to situations outside of therapy. In the light of this, social situations could then be simulated in the final phase of treatment, with a gradual shift from a movement or sports context to a client's daily life setting.

### *3.2.6 Avenues for future research*

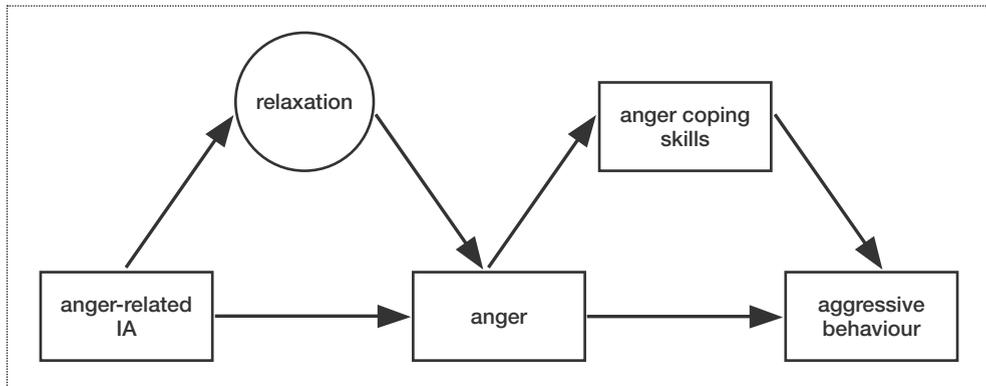
There is a need for (stronger) evaluation studies that include PMT-specific measures such as those for the promotion of IA and adaptive coping skills. This dissertation can be seen as a preparatory step towards an effectiveness study of PMT targeted at anger regulation problems and aggressive behaviour in people with MID-BIF. The accepted gold standard for the evaluation of an intervention is a randomised controlled trial (RCT). Such a design, with a waiting list control group, was used in a study by Singh and colleagues to evaluate their Soles of the Feet programme (2013). Since in clinical practice psychomotor therapists often

have waiting lists before treatment starts, such a design could be used for examining the PMT programme targeted at anger-regulation problems and aggressive behaviour as described above (e.g., the module by Bellemans and Burger, submitted). The primary outcome, similar to the primary outcome in the study conducted by Singh (2013), could be a reduction in aggressive behaviour. Secondary outcomes, similar to those in the study by Zwets and colleagues (2016), could include anger-related IA and coping skills (while angry). The ABSI-id and the Profile of Anger Coping Skills (PACS; Willner, Brace, & Phillips, 2005) seem promising instruments to measure anger-related IA and anger coping skills, respectively. The PACS was recently translated into Dutch, and the first runs have shown promising results with good interrater reliability for the version designed for personal caregivers (ICC = .85) and good item test-retest reliability for the client version (ICC range .61-.86) as well as for the caregiver version (ICC range .65-.97) (Mets, 2020). Before using both the ABSI-id and PACS for the evaluation in research or clinical practice, the sensitivity of change should also be examined. Additional points of attention for conducting a RCT might be the need to limit the range of IQ levels in the participating population and to consider the possibilities and opportunities that are available within facilities for individuals with MID-BIF for participating in an RCT.

The theoretical basis as described in this dissertation provides some direction for a further exploration of the interplay between anger, IA, anger coping skills and aggressive behaviour. This opens up another avenue for future research, namely a path analysis to empirically explore the role of anger-related IA and adaptive coping skills in relation to aggressive behaviour. Such an analysis may strengthen the theoretical foundation of anger-related IA in the light of anger-regulation and aggressive behaviour. The starting point of such a path analysis could be the assumption proposed by Novaco (2010): anger precedes aggressive behaviour. As the explicit role of IA needs a further examination of the process in which anger leads to aggressive behaviour (see Key finding one), this model could then be further explored with respect to complexity (including anger-related IA and anger coping skills as variables and using the subscales instead of the total scale of both the ABSI-id and the PACS). Based on the findings in this dissertation, such an analysis could reveal whether anger-related IA is indeed (indirectly) related to aggressive behaviour and whether this could lead to the early recognition of anger - and possibly to the prevention of aggressive outbursts. Working with different models, such a study could help test the assumptions that anger coping skills mediate the relationship between anger and aggressive behaviour, and that bodily down-regulations using relaxation mediate the relationship between anger-related IA and both anger and aggression. Figure 2 shows the basic assumed model. Figure 3 presents the more complex model that includes anger-related IA and anger coping skills, with relaxation highlighted as one of the anger coping skills. Relaxation is one of the eight strategies that could be used as an anger coping skill, but this particular strategy is assumed to influence anger at the beginning of anger development (in the process in which anger gains strength over time, leading to aggressive behaviour, see Figure 1). That being said, all eight strategies for coping with anger as included in the PACS (such as asking for help or counting to ten) may prevent the occurrence of aggressive behaviour when angry.



**Figure 2.** *The basic assumed model that could be explored in a path analysis.*



**Figure 3.** *The more complex assumed model that could be explored in a path analysis.*

## **4 Strengths and limitations**

This section highlights a number of strengths and offers critical remarks concerning the studies reported in this dissertation.

### **4.1 A broad range of perspectives and study designs**

One of the strengths of the research presented here is that it studied the problem in hand, how to intervene when individuals with MID-BIF present problems with anger regulation, from a variety of perspectives. The contribution of PMT targeted at anger regulation problems and aggressive behaviour was investigated from an empirical perspective (systematic review), from the perspective of therapists in clinical practice and from the perspective of clients: this latter group was not only involved in the adaptation of the ABSI-id, but clients were also asked about the PMT intervention they had completed. The findings from different perspectives are congruent and strengthen insights related to the efficacy of PMT as well as its mechanisms of action.

### **4.2 The active role of the clients in the outcomes of this dissertation.**

Another strength of the research discussed in this dissertation is that clients were actively involved in two of the five studies. There is an increasing interest in the contribution that people with intellectual disabilities can make by expressing their opinions about the therapy they undergo (e.g., Brown et al., 2011). We devoted all of Chapter 4 to the deliberation of clients' experiences in order to increase the quality and efficacy of PMT. Furthermore, as discussed in Chapter 5, people with MID-BIF were involved in the adaptation of the ABSI-id measurement instrument. The instrument that Roberts and colleagues (2020) adapted especially with the aim to make it suitable for measuring mindfulness did not appear to be an appropriate instrument as participants found the questions difficult to answer. In our study, we circumvented this problem by involving people with MID-BIF during the adaptation of the ABSI-id. We opted for an interview format and formulated alternative statements together with individuals with MID-BIF. This form of cooperation also led to items being deleted from the original pool of items in the ABSQ (Zwets et al., 2014): according to clients, these statements were too ambiguous, abstract or vague. Apart from its strengths, the current research had a number of limitations that should also be mentioned.

### **4.3 Bias**

Systematic reviews always carry the risk of publication bias. This also applies to the review conducted for this study, even though the literature was searched systematically. Studies are simply more likely to be published if they include significant positive effect (Sutton, 2009). This means that studies which do not report any effects may not pass the peer review process, and may thus be underrepresented. In this review, too, the studies that showed no significant effect formed a minority. Besides that, studies were relatively dated: especially with respect to progressive relaxation, all studies bar one were conducted more than 20 years ago. These older studies did not use the gold standards that are applied today, for instance with respect to the choice of research design and statistical methods, nor did they follow the same guidelines for presenting data (e.g., not all information was provided). The studies on Soles of the Feet (Singh, 2003, 2008, 2011, 2013) were conducted recently, but all were carried out by the same research group and were not replicated by independent researchers. The results of the review reported in this dissertation should therefore be interpreted with caution.

In the two qualitative studies discussed in this manuscript, the one in which therapists were asked to describe their approach and the one in which clients were asked to describe and evaluate this, different kinds of bias could have influenced the results. The psychomotor therapists show rather strong agreement on goals and methods used in therapy. The fact that they received the same form of education might have distorted the picture as their answers may represent to a large extent what they learned during their training to become a psychomotor therapist.

Also the answers given by clients may have been positively highlighted as only those who had finished their treatment were interviewed. Participants who had dropped out and those who may have had less positive experiences were not included. However, in the qualitative studies by Currie and colleagues (2019) and in the study carried out by Griffith and colleagues (2019), a similar approach was used. This signifies how hard it is to engage participants who drop out early.

### **4.4 The quantitative study showed limited (severe) aggressive behaviour**

In the quantitative studies, adults with as well as without anger regulation problems and aggressive behaviour were invited to participate. However, it should be noted that only few participants with (severe) aggressive behaviour were included. This means that these clients may have been underrepresented. It also means that greater attention could – and perhaps should – have been paid to this selection bias when participants were recruited. It could also be argued that we should have included participants from forensic facilities, since aggressive behaviour occurs two to three times more frequently in people with MID-BIF in a forensic setting than in the community (Taylor, Novaco, & Brown, 2016). Future research could also include forensic settings and concentrate on (anger-related) IA with regard to emotional regulation and (severe) aggressive behaviour in people with MID-BIF in these settings.

## **5 Conclusion**

All in all, the findings reported in this dissertation indicate that PMT may positively influence anger regulation and aggressive behaviour in people with MID-BIF. Therefore, PMT should be part of a multidisciplinary treatment programme that is targeted at anger regulation problems and/or aggressive behaviour. The concrete PMT techniques that are available and the possibility to practise in the here-and-now with both

body-oriented and movement-oriented interventions empower clients with MID-BIF. PMT helps clients to gain control over the process that leads from anger to aggressive outbursts, especially through an increased awareness of body signals that indicate anger and by practising adequate techniques to cope with increasing anger. By emphasising the active power of clients to instigate change and by applying appropriate tools, not only the problem in hand is tackled, but also a message of hope and empowerment is communicated. Personal caregivers may benefit from PMT, too, as it offers concrete tools for practice, also in clients' day-to-day living situations (e.g., by using the tension thermometer and practising breathing techniques). This may, in turn, decrease perceived stress on the part of caregivers that results from a client's aggressive behaviour. In the light of PMT education, greater attention should be paid to the specifics of the approach where individuals with MID-BIF are concerned, both in terms of PMT diagnostics and in terms of treatment. Finally, while modern society often fails to recognise the specific challenges which this group faces, it is vital that professionals do in fact acknowledge these issues, not only in the usual care settings for individuals with MID-BIF, but also – perhaps less obviously but by no means less importantly – in general psychiatric and forensic settings. With this dissertation, we hope to have strengthened and extended the foundations that clinical practice and future PMT research can build upon for the benefit of individuals with MID-BIF, wherever they may be diagnosed and treated.



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# APPENDICES



## Appendix 1: Changes throughout the adaptation process leading to the ABSI-id (9-item version)

Step 1: first adaptation	Step 2: trial assessment	Step 3: qualitative assessment	Step 4: psychometric statistical analysis
<p>[Introduction to be read by the interviewer]                      Everybody can become tense as the result of the behaviour of someone else, such as during an argument.</p>	<p>[Introduction to be read by the interviewer]                      Everybody can become tense as the result of the behaviour of someone else, such as during an argument. Was there a situation in the last two weeks were you experienced being angry as a result of behaviour of someone else?                      [ask for at least 2 examples of the participant, possibly with help of a staff member].</p>	<p>[Introduction to be read by the interviewer]                      Everybody can become tense as the result of the behaviour of someone else, such as during an argument. Was there a situation in the last two weeks were you experienced being angry as a result of behaviour of someone else?                      [ask for at least 2 examples of the participant, possibly with help of a staff member].</p>	<p>[Introduction to be read by the interviewer]                      Everybody can become tense as the result of the behaviour of someone else, such as during an argument. Was there a situation in the last two weeks were you experienced being angry as a result of behaviour of someone else?                      [ask for at least 2 examples of the participant, possibly with help of a staff member].</p>
<p>This questionnaire contains several statements about reactions of your body that arise when you become angry in such a situation. Please think whether these apply to you. You can answer choosing a score between not at all to very much, linked to a visual scale.</p>	<p>This questionnaire contains several statements about reactions of your body that arise when you become angry in such a situation. Please think whether these apply to you. You can answer choosing a score between not at all to very much, linked to a visual scale.</p>	<p>This questionnaire contains several statements about reactions of your body that arise when you become angry in such a situation. Please think whether these apply to you. You can answer choosing a score between not at all to very much, linked to a visual scale.</p>	<p>This questionnaire contains several statements about reactions of your body that arise when you become angry in such a situation. Please think whether these apply to you. You can answer choosing a score between not at all to very much, linked to a visual scale.</p>

## Appendix 1: (Continued)

Step 1: first adaptation	Step 2: trial assessment	Step 3: qualitative assessment	Step 4: psychometric statistical analysis
My heart starts beating faster	My heart starts beating faster / <b>more frequently</b>	My heart starts beating faster / more frequently	<b>1:</b> My heart starts beating faster / more frequently
My hands start sweating more	My hands start sweating more / <b>transpiring more</b>	My hands start sweating more / transpiring more	<b>[deleted: cross loader]</b>
My body freezes	My body freezes / <b>becomes stiffened</b>	<b>[deleted: ambiguous]</b>	
I get light-headed	I get light-headed / <b>woozy / dizzy</b>	<b>[deleted: ambiguous]</b>	
My breathing becomes irregular	My breathing becomes irregular / <b>then fast then slow</b>	My breathing becomes irregular / then fast then slow	<b>2:</b> My breathing becomes irregular / then fast then slow
My body starts shaking	My body starts shaking / <b>trembling</b>	<b>[deleted: ambiguous]</b>	
I get an adrenaline kick	I get an adrenaline kick / <b>a rush of energy through my body</b>	<b>[deleted: ambiguous]</b>	
My head starts feeling warmer	My head starts feeling warmer / <b>hot</b>	My head starts feeling warmer / hot	<b>3:</b> My head starts feeling warmer / hot
My breathing becomes faster	My breathing becomes faster / <b>more frequently</b>	My breathing becomes faster / more frequently	<b>4:</b> My breathing becomes faster / more frequently
I start sweating more	I start sweating more / <b>transpiring more</b>	I start sweating more / transpiring more	<b>5:</b> I start sweating more / transpiring more
My muscles become tensioned	My muscles become tensioned / <b>contracted</b>	My muscles become tensioned / contracted	<b>[deleted: cross loader]</b>
My hands start shaking	My hands start shaking / <b>trembling</b>	<b>[deleted: ambiguous]</b>	
My body becomes warmer	My body becomes warmer / <b>hot</b>	My body becomes warmer / hot	<b>6:</b> My body becomes warmer / hot
My heart starts beating harder	My heart starts beating harder / <b>pounding</b>	My heart starts beating harder / pounding	<b>7:</b> My heart starts beating harder / pounding
My jaw muscles become tensioned	My jaw muscles become tensioned / <b>I grind my teeth</b>	My jaw muscles become tensioned / I grind my teeth	<b>[deleted: low communality]</b>
My breathing becomes deeper	My breathing becomes deeper / <b>larger</b>	My breathing becomes deeper / larger	<b>8:</b> My breathing becomes deeper / larger
I get a dry mouth	I get a dry mouth / <b>I get less spit</b>	<b>[deleted: ambiguous]</b>	
I clench my fists	I clench my fists / <b>I squeeze my hands</b>	I clench my fists / I squeeze my hands	<b>9:</b> I clench my fists / I squeeze my hands

Note: The introduction and description of the statements concerning anger-related body signals during the different stages of the adaptation process leading to the definitive ABS-I-d. Changes are marked in bold. In the final column the items are numbered from 1 to 9.



# ENGLISH SUMMARY





## English summary

This chapter summarises the main findings of the studies that are included in this dissertation and that are focus on the contribution of psychomotor therapy (PMT) to the decrease of anger regulation problems and aggressive behaviour in people with mild intellectual disabilities or borderline intellectual functioning (MID-BIF).

Among individuals with MID-BIF, aggressive behaviour is a common problem assumed to be associated with deficiencies in these individuals' awareness of their emotional state as well as in their ability to regulate their anger. PMT enhances emotion regulation through body-oriented and movement-oriented interventions. In this kind of treatment, typified by a strong experiential character, body awareness is seen as a key element. When PMT is applied in targeting anger regulation problems and aggressive behaviour, it is assumed that a person should be able to focus attention on body signals associated with anger as well as to become aware of these. The latter phenomenon is called interoceptive awareness (IA). In addition, it is hypothesised that the repetitive practising of newly acquired and alternative behaviour is important in PMT. However, as can be read in Chapter 1, there is a lack of scientific knowledge about the assumed working mechanisms and the effectiveness of PMT and the body-oriented and movement-oriented interventions that are part of this form of therapy, specifically where individuals with MID-BIF are concerned. Aimed at filling this gap, this research project focused on PMT both in terms of diagnostics and in terms of the treatment of aggressive behaviour in people with MID-BIF. This dissertation discusses the efficacy of body-oriented and movement-oriented interventions as applied in PMT, the content of the PMT-programme and the assumed working mechanisms, the experiences of clients and finally the adaptation of an instrument that could be used for diagnostics and the evaluation of PMT.

Chapter 2 presents the results of a systematic review. This overview of the current state of the art aims to inform clinicians on the research basis and the efficacy of body-oriented and movement-oriented interventions targeting anger regulation problems and/or aggressive behaviour in people with MID-BIF. The systematic review included nine studies. All of these applied body-oriented methods and techniques such as progressive relaxation or a mindfulness intervention focusing on a neutral body part (i.e., Soles of the Feet). Six studies revealed a substantial reduction of aggressive behaviour, and one study also reported a substantial reduction of anger. That being said, certainty of evidence was often rated as inconclusive, mostly because of the lack of an adequate experimental design (e.g., case studies). Still, body-oriented interventions as often applied in PMT seem to be a promising tool to decrease aggressive behaviour in individuals with MID-BIF. As no studies were found on movement-oriented interventions, no firm conclusions could be drawn about these elements of psychomotor therapy programmes targeting anger and aggressive behaviour in people with MID-BIF.

Chapter 3 presents results obtained through interviews held with seventeen Dutch psychomotor therapists. With the Intervention Mapping Approach used as a framework, these therapists were asked to describe the programme they offered to their clients with MID-BIF who demonstrated anger regulation problems and/or aggressive behaviour. Information was gathered concerning the problem at hand, the theoretical basis for the interventions and the therapists' opinions about the assumed mechanisms of action. Information was also gathered on the content and coherence of the psychomotor programme as applied by the therapists and finally on the evaluative procedures. The interviews showed that even though therapists could only provide a limited theoretical basis of the PMT interventions concerned, there was general agreement that raising interoceptive awareness (IA; i.e., becoming conscious of anger-related

body signals) and strengthening adaptive coping skills are key elements in the psychomotor treatment of problems related to anger and aggression regulation. Results also showed that the choice for the applied interventions is often based on a therapist's clinical experience and/or a small number of theoretical arguments. All therapists assigned the body a crucial role: as an information source and a downregulation tool in the methods and techniques they applied. They explained that the emphasis of the treatment they offer lies on increasing IA, increasing adaptive coping skills or a combination of the two. For the evaluation of the interventions, however, valid and reliable instruments are used to a limited extent only. This is caused by the absence of adequate instruments designed for individuals in the target group that measure these specific goals and mechanisms of action. To date, no instruments exist to assess IA or changes in IA in individuals with MID-BIF.

Chapter 4 describes the experiences of clients who received PMT for their anger regulation problems or aggressive behaviour. The study reported in this chapter aimed to explore the assumed PMT mechanisms of action and perceived outcomes. Seven participants were interviewed closely after they had finished their PMT treatment. The Interpretative Phenomenological Analysis was used to analyse the interviews. According to the participants, the main goals were becoming aware of increasing (bodily) tension and/or learning to downregulate tension. The participants emphasised the possibility of learning by doing as a key element. The therapeutic alliance was also mentioned as crucial, especially in terms of being taken seriously and feeling equal. These elements of PMT are perceived as essential for creating a safe and motivating context, be this a movement or a sports context, in which participants can directly experiment with alternative and newly learned behaviour. As a result of their treatment, participants perceived a reduction of aggressive outbursts as well as an increased interoceptive awareness and improved adaptive coping skills. In turn, this resulted in increased self-control and in improved self-efficacy and self-esteem.

On an overarching level, the experiences as reported by the clients can be considered from the perspective of what are generally described as the common factors of successful (psycho)therapy: factors that lead to treatment success regardless of the type of intervention. The first factor is the therapeutic relationship. Clients stated that the therapist worked with them in a respectful, empowering manner and with mutual agreement about treatment goals. Thus, co-creations seem to contribute to the client's feeling of equality in relation to the therapist. The concrete approach with sports or movement-oriented activities combined with body-oriented activities enhances a hopeful context, the second common factor. This context helps clients to believe that they can gain control over their own behaviour. The rationale (the theoretical model) is defined as the third common factor. In this case, clients recognise that the central element in the approach is the assumption that aggressive behaviour comes from a deficiency in IA and a lack of adaptive coping skills. They express that therapy is offered accordingly, the fourth common factor, with activities that are directly focused on the body a) as a source of information to recognise increased tension or anger and b) as a tool for downregulating this tension.

Chapter 5 investigates the psychometric properties of an adapted IA measurement instrument. In close cooperation with individuals from the target group, the Anger Bodily Sensations Interview - intellectual disability (ABSId) was developed. This was done in four stages. The psychometric characteristics were examined in a convenience sample of 208 people with MID-BIF living in residential facilities. The ABSId consists of 9 items, and an exploratory factor analysis revealed two subscales: activity and body heat. The items of the subscale activity reflect ways to identify bodily tension, for instance by becoming aware of breathing behaviour so that it can subsequently be manipulated to downregulate tension. The items on the subscale body heat, for example sweating, refer to body signals that can be used to identify increased

bodily tension. However, these body signals are less easily influenced. Confirmatory factor analysis on the same sample showed an acceptable fit for both subscales. Internal consistency and test-retest reliability of the ABSI-id were good. Convergent validity was acceptable. No significant differences were found between people with MID and those with BIF, either on the total scale or the subscales. This study showed that the ABSI-id is a feasible instrument for measuring anger-related IA in people with MID-BIF, in research settings and in clinical practice. Nevertheless, further research is needed where construct validity and sensitivity to change are concerned.

Chapter 6 presents a general discussion of the findings reported in this dissertation. The combination of different research questions and research designs made it possible to explore the contribution of PMT targeted at anger regulation problems and aggressive behaviour in people with MID-BIF and to approach this exploration from different perspectives. Overall, it may be concluded that anger-related IA functions as a mechanism of action of PMT targeted at anger regulation problems and aggressive behaviour. Second, PMT seems to contribute to the regulation of anger and to decrease aggressive behaviour by applying both body-oriented and movement-oriented interventions. The Discussion section also lists a number of recommendations for future research: a) a further validation of the ABSI-id, b) a path analysis to examine the role of IA and adaptive coping skills in relation to aggressive behaviour in people with MID-BIF and c) an evaluation study of PMT, with IA as one of the outcome measures.

Finally, the Discussion section describes the current study's strengths and limitations. In terms of strengths, the different perspectives that were considered to gain information deserve a mention here: the systematic review revealed empirical information, therapists were interviewed to obtain clinical information and clients were asked about their completed PMT treatment as well as on the ABSI-id. In terms of the study's limitations, bias should be mentioned. Publication bias might have distorted the findings of the review, as studies with a positive effect have a greater chance of being published. Another form bias may have resulted from the fact that participating therapists mostly followed the same education programmes. Finally, clients with positive PMT experiences might have been over-represented.



# NEDERLANDSE SAMENVATTING





## Nederlandse samenvatting

Agressieproblematiek komt veel voor bij mensen met een licht verstandelijke beperking (LVB) en wordt verondersteld samen te hangen met tekorten in de herkenning en regulatie van boosheid. Binnen de psychomotorische therapie (PMT) wordt gewerkt aan betere emotieregulatie via lichaamsgerichte en bewegingsgerichte oefeningen. Bewustzijn van het lichaam wordt als een spil gezien binnen deze sterk ervaringsgerichte behandeling. Wanneer PMT wordt ingezet op het reguleren van boosheid en agressief gedrag wordt verondersteld dat het nodig is dat mensen hun aandacht kunnen richten op én dat zij zich bewust worden van de lichaamssignalen die gepaard gaan met frustratie of boosheid. Dit laatste wordt interoceptief bewustzijn genoemd. Daarnaast wordt aangenomen dat ook het herhaaldelijk kunnen oefenen van ander en soms nieuw gedrag als alternatief voor agressief gedrag belangrijk is. Zoals kan worden gelezen in hoofdstuk 1 wordt PMT in de zorg voor mensen met een LVB veel toegepast, maar de wetenschappelijke onderbouwing ervan staat in de kinderschoenen. In dit proefschrift wordt hieraan een bijdrage geleverd door verslag te doen van onderzoek naar PMT in het kader van diagnostiek en behandeling van agressief gedrag bij mensen met een LVB. Ingegaan wordt op de werkzaamheid van de lichaamsgerichte en bewegingsgerichte interventies zoals gebuikt in de PMT, de inhoud van het aanbod en veronderstelde werkingsmechanismen, de ervaringen van cliënten en de ontwikkeling van een meetinstrument dat ingezet zou kunnen worden bij de indicatiestelling en evaluatie.

In hoofdstuk 2 zijn de resultaten van een systematische literatuurstudie gepresenteerd naar de effectiviteit van lichaams- en bewegingsgeoriënteerde interventies voor mensen met een LVB die verwezen worden vanwege problemen met de regulatie van boosheid en agressief gedrag. Doel van dit overzicht was om inzicht te krijgen in de effectiviteit van deze interventies. Negen studies werden geïnccludeerd, alle gericht op lichaamsgerichte interventies zoals progressieve relaxatie of mindfulness interventies. Zes studies lieten een substantiële afname van agressief gedrag zien en in één studie werd ook een reductie van boosheid gerapporteerd. Deze resultaten geven een positieve indicatie over de werkzaamheid van de lichaamsgerichte interventies. Echter, door het veelal ontbreken van experimentele designs kan geen eenduidige conclusie worden getrokken over de evidentie van deze interventies. Over het inzetten van bewegingsgerichte interventies die ook vaak onderdeel zijn van het aanbod binnen PMT kon op basis van deze review geen uitspraak worden gedaan, aangezien er geen studies hierover voorhanden bleken.

In hoofdstuk 3 wordt een studie beschreven waarin zeventien psychomotorische therapeuten werden bevraagd over het PMT-programma zoals door hen aangeboden bij mensen met een LVB die problemen hebben met het reguleren van boosheid en/of agressief gedrag. Intervention Mapping, een systematische benadering om een interventieprogramma te ontwikkelen en te evalueren, werd hierbij ingezet als referentiekader. Achtereenvolgens werd gevraagd naar de (theoretische) visie op agressieregulatieproblematiek, welke doelen binnen het programma worden nagestreefd, de interventies die ingezet worden en de opvattingen over de veronderstelde werkingsmechanismen, de implementatie en de wijze van evaluatie van PMT. De studie liet zien dat er overeenstemming is over wat het doel van de PMT is bij agressieproblemen, namelijk het verbeteren van het interoceptief bewustzijn en het vergroten van adaptieve copingvaardigheden. De therapeuten baseren hun oordeel over de rol van het interoceptief bewustzijn in het kader van het reguleren van boosheid en agressie op hun klinische ervaring en slechts in beperkte mate op wetenschappelijke theorieën en empirisch onderbouwde modellen voor agressief gedrag. Desalniettemin werd door alle therapeuten het belang van het lichaam bij de toepassingen van psychomotorische interventies benadrukt. Zo werd het lichaam als informatiebron bij oplopende spanning

genoemd, maar ook het lichaam als instrument om de spanning weer te laten zakken. Valide en betrouwbare instrumenten blijken maar zeer weinig gebruikt te worden bij de diagnostiek en evaluatie van de uitkomsten van PMT. Het ontbreken van valide instrumenten voor met name het meten van interoceptief bewustzijn bij mensen met een LVB noemden de psychomotorische therapeuten als een groot gemis.

In hoofdstuk 4 zijn de ervaringen beschreven van cliënten met een LVB die recentelijk PMT gericht op het reguleren van boosheid en agressief gedrag hadden afgrond. Het doel van deze studie was het exploreren van de werkingsmechanismes en uitkomsten van PMT zoals ervaren door de cliënten. Zeven deelnemers werden geïnterviewd, waarbij de Interpretatieve Fenomenologische Analyse werd gebruikt voor het analyseren van de interviews. Volgens de deelnemers stonden het voelen van olopende (lichamelijke) spanning en/of het weer verminderen van deze spanning centraal binnen hun PMT-behandeling. Het ervaringsgerichte karakter, 'leren door te doen', wordt als cruciaal ervaren. Daarnaast wordt de aard van de therapeutische relatie, waardoor men zich serieus genomen en gelijkwaardig voelt, als essentiële kenmerken van de PMT benadering ervaren. Hierdoor was het mogelijk om een veilige en motiverende (sport- en bewegings)context te creëren waarin geëxperimenteerd kon worden met alternatief en nieuw geleerd gedrag. Gevraagd naar de resultaten van de behandeling werd een vermindering van agressieve uitbarstingen genoemd. Cliënten gaven aan beter te voelen als er sprake was olopende spanning/boosheid omdat zij de lichamelijke signalen sneller herkenden. Na de behandeling kon men ook beter omgaan met die spanning, bijvoorbeeld door uit een situatie te stappen, door zelf de ontspanning te zoeken of door eerder aan een andere persoon duidelijk te maken wat er aan de hand is. Deze veranderingen resulteerde volgens de betrokkenen in meer zelfcontrole en zelfvertrouwen.

De ervaringen van de cliënten kunnen in het perspectief worden geplaatst van wat wel de common factors worden genoemd: factoren die onafhankelijk van het soort behandelinterventie bijdragen aan het succes daarvan. De eerste factor is de therapeutische relatie die ervaren wordt als één waarin sprake is van een respectvolle samenwerking en waarbij overeenstemming is over de therapiedoelen. Co-creaties dragen bij tot een gevoel van gelijkwaardigheid bij de cliënt. Een hoopgevende context waarin concreet aan verandering kan worden gewerkt is de tweede factor. Als derde factor wordt de door de cliënt en therapeut aanvaardde rationale, het theoretisch model onderliggend aan de gekozen interventies, genoemd. In dit geval gaat het om de veronderstelling dat agressief gedrag voortkomt uit een gebrek aan interoceptief bewustzijn en coping vaardigheden. De interventies sluiten direct aan op de rationale, wat de vierde factor is die kan bijdragen aan succes. Zo worden binnen PMT interventies ingezet waarbij het lichaam wordt gebruikt als informatiebron bij olopende spanning (interoceptief bewustzijn) en als instrument om de spanning te verminderen bij verhoogde spanning (coping vaardigheden).

In hoofdstuk 5 wordt een studie beschreven naar de psychometrische kenmerken van een aangepast instrument om interoceptief bewustzijn bij boosheid te meten bij mensen met een LVB. Het Boosheid Lichamelijke Signalen Interview – verstandelijke beperking (BLSI-vb) is een vragenlijst die in vier fases en in samenwerking met mensen met een LVB is ontwikkeld. Psychometrische kenmerken van de BLSI-vb werden onderzocht bij 208 mensen die verbleven in instellingen voor mensen met een verstandelijke beperking. De BLSI-vb bestaat uit negen items, waarbij na een exploratieve factor analyse twee subschalen werden onderscheiden: activiteit en lichaamswarmte. De items behorende bij de subschaal lichaamswarmte hebben met name een signalerende functie bij olopende spanning. De lichaamssignalen zoals genoemd in de subschaal activiteit verwijzen eveneens naar signalen die ingezet worden bij het opmerken van olopende spanning maar kunnen tevens gemanipuleerd worden in het kader van het reduceren van spanning. Een confirmatieve factor analyse bevestigde deze subschalen. Interne

consistentie en test-hertest betrouwbaarheid van de BSLI-vb bleken goed en convergente validiteit was acceptabel te noemen. Er werden geen significante verschillen gevonden tussen mensen met een licht verstandelijke beperking en mensen met zwakbegaafdheid voor de totale score en voor de scores op de subschalen van de BLSI-vb. Deze studie geeft aan dat de BSLI-vb toepasbaar is en dat het interoceptief bewustzijn bij boosheid in kaart kan brengen bij mensen met een LVB in het kader van onderzoek en klinische praktijk. Waar het gaat om de construct validiteit en sensitiviteit voor verandering is verder onderzoek noodzakelijk.

Hoofdstuk 6 betreft de algemene discussie van dit proefschrift. Hierin wordt vanuit de verschillende perspectieven gekeken naar de bijdrage van PMT gericht op boosheidsregulatie en agressief gedrag. Een eerste belangrijke bevinding van dit proefschrift is dat PMT lijkt bij te dragen aan het beter omgaan met boosheid en het verminderen van agressief gedrag door het inzetten van lichaamsgerichte én bewegingsgerichte interventies. Een tweede bevinding is dat interoceptief bewustzijn een werkingsmechanisme lijkt te zijn voor PMT gericht op reguleren van boosheid en agressief gedrag. Er worden ook aanbevelingen gedaan voor vervolgonderzoek: a) verdere validatie van BLSI-vb, b) een pad analyse om de rol van interoceptief bewustzijn en adaptieve copingvaardigheden te onderzoeken in relatie tot agressief gedrag bij mensen met een LVB en c) onderzoek gericht op behandel-evaluatie van PMT, met interoceptief bewustzijn als uitkomstmaat.

Daarnaast worden sterktes en beperkingen van dit onderzoek besproken. Bij het eerste kan gedacht worden aan het belichten van de bijdrage van PMT vanuit verschillende perspectieven. Zo werd inzicht verworven vanuit de empirie (systematische review), werden therapeuten in de klinische praktijk bevroegd en werden de inzichten van de cliënten over de afgesloten PMT interventie alsook over het instrument in kaart gebracht. Bij het laatste kan onder andere gedacht worden aan bias in de onderzoeken, zoals de publicatie bias waardoor negatief afgesloten studies niet in de review zijn opgenomen en de selectie van deelnemende therapeuten, die grotendeels dezelfde opleiding die ze hebben genoten en deelnemende groep cliënten waarin degenen die positieve ervaringen hebben met PMT interventies gericht op agressieproblematiek mogelijk zijn oververtegenwoordigd.



# ABOUT THE AUTHOR





## **About the author**

Tina Bellemans was born on February 14, 1984 in Herentals, Belgium. She studied Human Movement Sciences and in 2007 she completed her postgraduate education at the Catholic University of Leuven (Belgium) to become a psychomotor therapist. She worked as a psychomotor therapist at the Hartekamp Groep (Heemstede, the Netherlands) and after 5 years she joined the Bachelor's programme in Psychomotor Therapy at the Windesheim University of Applied Sciences in Zwolle. Since she started her PhD project in 2016, she is also a teacher at the Master's programme and currently is also involved in the physiotherapy programme of the University of Hasselt (Belgium). Besides that, Tina is still a part of the research team of the Windesheim's department Human Movement, Health and Wellbeing.

As a psychomotor therapist she was specialised in treating people with intellectual disabilities. She noticed that people with mild intellectual disabilities (MID) or borderline intellectual functioning (BIF) were often referred to PMT for anger regulation problems and aggressive behaviour. As limited was known about PMT in this target group, this aroused her interest to conduct research on this topic. As a teacher she hopes to implement the insights of her PhD-research in the educational programmes for PMT.



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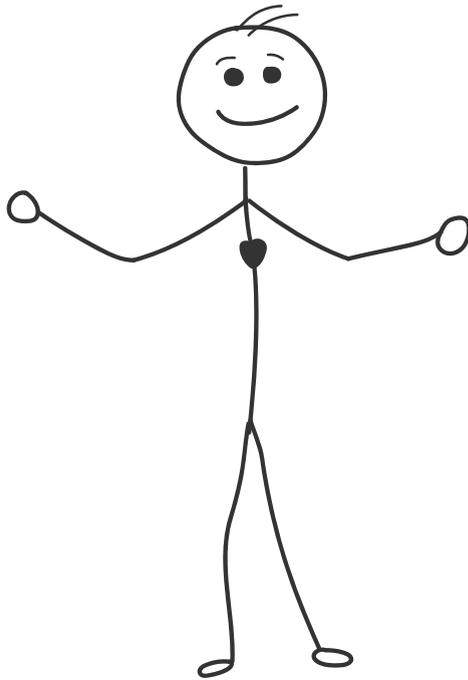


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# DANKWOORD





## Dankwoord

*“Ik heb het nog nooit gedaan, dus ik denk dat ik het wel kan.”*

Pippi Langkous had al lang door welke insteek nodig is voor het schrijven van een proefschrift. Maar laat ik daar nog wel één persoonlijke bedenking bij vermelden. Zo'n promotieproces heeft wat gelijkenissen met PMT. Zo is het een leerroute met vallen en opstaan waarbij fouten gemaakt mogen worden (hoewel ik dat goed tegen studenten en cliënten kan zeggen, blijft dat ook voor mij een leerpunt). Om weer op te staan is wel een portie koppigheid en doorzettingsvermogen nodig, tja, deze kenmerken zijn Pippi niet vreemd... en ik denk dat mijn omgeving zal beamen dat deze eigenschappen ook bij mij passen. Daarnaast staan tijdens het PhD-traject co-creaties (in de vorm van artikelen) centraal. De rol van mijn begeleiders is ook erg belangrijk geweest om deze dissertatie vorm te geven en om te staan waar ik vandaag sta. Ik ben blij dat ik in dit onderdeel van mijn proefschrift even stil kan staan bij iedereen die een bijdrage heeft geleverd, op welke manier dan ook, aan het tot stand komen van dit proefschrift.

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ook om samen even stil te staan en te genieten van het hier en nu. Sandra, jij was (én bent) er altijd voor me! De autoritten van Leusden naar Zwolle en terug... ik kon even zeuren en mijn hart luchten, maar ik kon ook het plezier delen van een geaccepteerd artikel. Deze ritten waren ook genietmomenten: de mooie zonsopkomsten of de mist over de weilanden en de talloze keren dat we ergens vanuit een witte auto op de A28 de wereldproblemen getracht hebben op te lossen. Ook onze gedeelde passie "sporten tot het gaatje" was een goede uitlaatklep tijdens het schrijven van dit proefschrift (en zal dat waarschijnlijk ook altijd blijven). Op dinsdag en zaterdag blijven onze "therapeutische combat-sessies" in de agenda staan.

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Maar in dit alles verdient één man toch wel pluimen ("promo-veren"). Lieve Moran, jouw relativeringsvermogen, de spiegel die je me soms (lees maar vaak) voorhield en vooral je onuitputtelijke steun en liefde. Wat fijn dat je er steeds voor me bent, zelfs (of misschien wel nét) in grommelige tijden. En mijn kerels, Matan, Noam and Ya'ir, jullie hielpen me enorm met het in perspectief plaatsen van dit werk. Jongens, jullie zullen altijd op de eerste plaats komen! En euhm, ik denk dat jullie koppigheid en doorzettingsvermogen ook jullie nog ver zal brengen in het leven.

