

***Case Study 1: An Evidence-Based Practice Review Report***

***Theme: School (setting) based interventions for children with special educational needs (SEN)***

**The Effectiveness of Mindfulness-Based Interventions for reducing behavioural difficulties in children and adolescents with Autism Spectrum Disorders**

**Summary**

Mindfulness can be defined as purposely paying attention in the present moment. The application of mindfulness in intervention approaches has been seen in various fields of research. In the field of education, systematic reviews and meta-analysis have found Mindfulness-Based Interventions (MBIs) to be effective in, for example, Special Educational Need populations and for individuals experiencing mental health difficulties (with ASD). It is recommended. Limitations and suggestions for future research are discussed.

## **Introduction**

### ***Mindfulness-Based Interventions***

Mindfulness finds its historical roots in Buddhism and has been defined as “paying attention in a particular way: on purpose, in the present moment and non-judgmentally” (Cullen, 2011, p. 187). Over the past few decades, mindfulness has increased in popularity in western societies and mindfulness-based interventions (MBIs) have been developed for therapeutic implementation across various fields of research (Cullen, 2011). This has ranged from use in cancer care (Carlson, 2016) and for individuals with mental health difficulties (Kallaprian et al., 2015), to use with young offenders (Simpson et al., 2018) and Chronic Pain sufferers (Veehof et al., 2016).

Furthermore, meta-analysis of MBIs has revealed high degrees of effectiveness across these areas of research. For example, a systematic review and meta-analysis on MBI for youth with anxiety reported significant effects when using MBIs in treatment (Borquist-Conlon et al., 2017). Similar results were found for use with psychiatric disorders (Goldberg et al., 2018), obesity-related eating behaviours (Reilly et al., 2014), Substance Use Disorders (Chiesa & Serretti, 2014; Sancho et al., 2018) and for ‘general health’ consequences, such as improved emotional regulation, reduced stress and heightened cognitive outcomes (Howarth et al., 2019).

### ***Theories of effectiveness***

Research examining the underlying effectiveness of MBIs suggests that MBIs may enhance positive emotional regulation strategies and self-compassion levels as well as decreasing rumination and experiential avoidance (Chiesa et al., 2014). These changes, in turn, are associated with the overt benefits of mindfulness, such as improved mental wellbeing

(Chiesa et al., 2014). The possible mediating effect of emotional regulation and emotion-related processing has been found across research (Hoge et al., 2020; Ma et al., 2018).

Furthermore, evidence suggests positive neurological effects of MBI. A systematic review by Young et al. (2018) suggests that MBIs are associated with neurological changes in functioning of the insula, plausibly impacting awareness of internal reactions 'in-the-moment' (Young et al., 2018). There may also be a possibility for MBIs to act as a mediating factor for

increased executive functioning capabilities (Young et al., 2018).

The application of MBIs for individuals with Special Educational Needs and Disability (SEND) in educational contexts has also been found to be effective. For example, a

reviews and meta-analysis indicating MBI as effective in reducing behavioural difficulties in the general population (Klingbeil et al., 2017; Tao et al., 2021) and for individuals with Intellectual Disability (Harper et al., 2013), there are currently no systematic reviews that synthesise data on a wide range of behavioural dimensions, including physical, verbal, self-injurious and destructive behaviour in ASD populations. Therefore, this review aims to fill this gap in the evidence base.

### ***Relevance to the field of Educational Psychology***

In Educational Psychology, Educational Psychologists (EPs)





**Table 2**

Inclusion and Exclusion Criteria

		Inclusion Criteria	Exclusion Criteria	Rationale
1	Age of participants	Under the age of 25	Over the age of 25	The current review is interested in examining the impact of MBIs for use in Educational Psychology. The SEND Code of Practice (2014) outlines the age range relevant to the work of EPs as 0-25.
2	Diagnosis	The participants have an official diagnosis of ASD	Participants are awaiting official diagnosis or have no diagnosis	The current review aims to examine the effectiveness of MBIs in ASD populations. Therefore, a diagnosis of ASD is needed.
3	Content of the intervention	Mindfulness must be a central aspect of the intervention	Mindfulness is a minor aspect of the intervention	As this review is asking whether MBIs are effective, if an intervention involves additional aspects other than mindfulness, mindfulness must be considered a central aspect of the overall intervention. This is because it will become unclear as to which variables are leading to specific outcomes and, therefore, it will become difficult to accurately determine



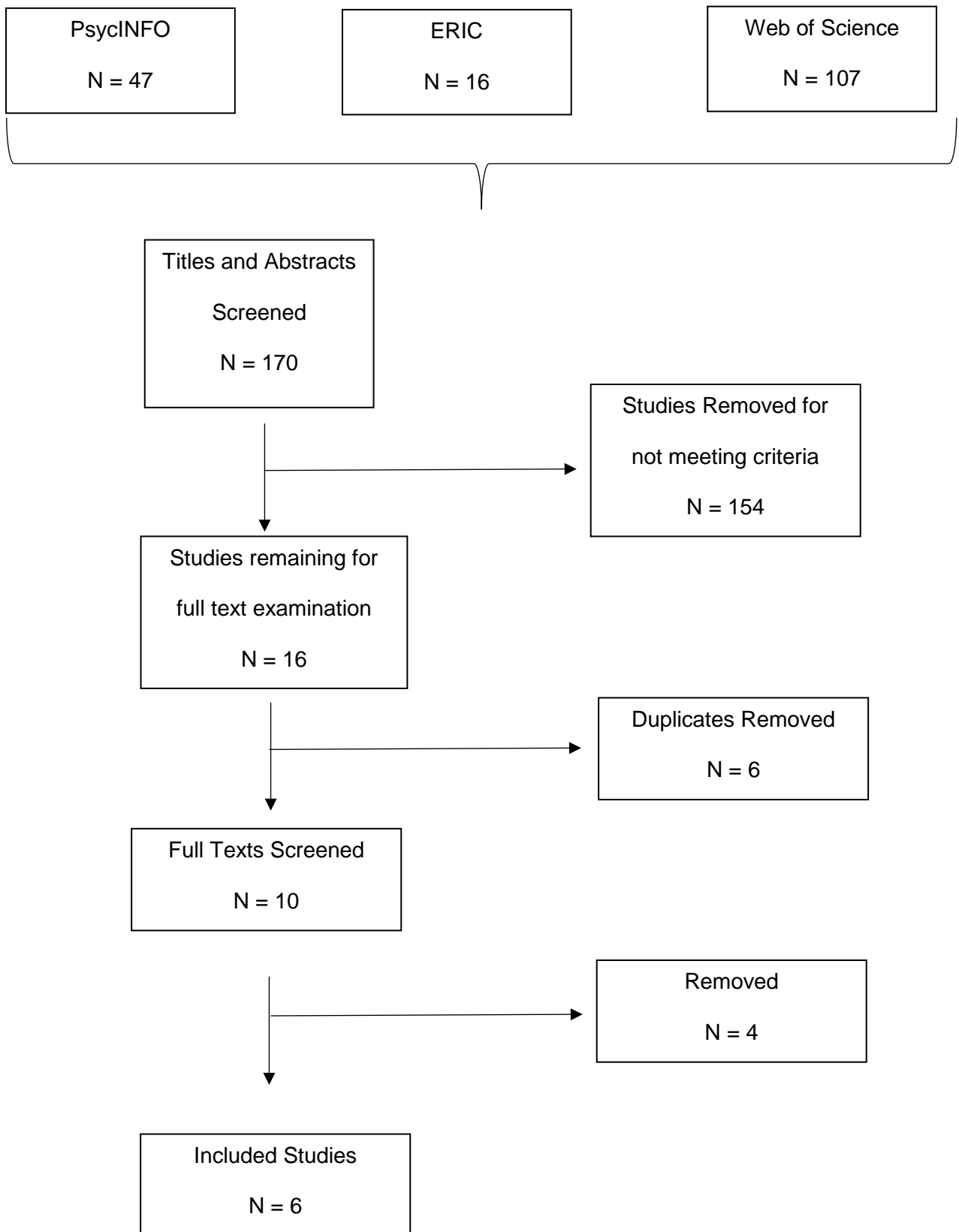
***Doctorate in Educational and Child Psychology***

persons externalised which measure externalised behaviours, not internalised social and emotional (objective, observable) internalised behaviour difficulties. behaviour, including verbal, physical, destructive, self-injurious behaviour

7	Peer review	The study must appear in a peer reviewed journal	Unpublished articles or thesis projects	In order to confidently examine the effectiveness of MBIs, only studies that have gone through the peer review process will be considered. This is due to the peer review process encouraging high quality research and rigorous evaluation by experts within the field.
8	Language	Studies are available in English	Studies are only in a language other than English	As the reviewer is English, in order to effectively and accurately review research articles, these articles must be in English.

Figure 1

Flow Chart of the Literature Search







**Table 4**

Weight of Evidence (WoE) ratings for the studies evaluated in this review

	WoE A	WoE B	WoE C	WoE D
Singh et al. (2011A)	2.52	2	2.17	2.23 (Medium)

of the demographics of participants, however, this sometimes excluded ethnicity data. In Ridderinkhof et al. (2018), the sample was described in good detail, however, the size of the sample was not justified. This was reflected in WoE A, in line with Law et al.'s (1998) coding protocol.

As is common in ASD diagnosis and statistics, participants were predominately male. All studies except Ridderinkhof et al.'s (2018) had solely male samples. Ridderinkhof et al.'s (2018) study had 80% male participants (n=36). All studies, excluding Ridderinkhof et al.'s (2018) study, included a qualitative summary of the participants' behavioural difficulties.

In all studies, with the exception of Singh et al. (2021) and Ridderinkhof et al. (2018), there was a limited description of how participants were selected. In Ahemaitijiang et al. (2020) no description of how participants were selected was given. This is reflected in WoE A and could indicate potential selection bias in studies.

Description of the setting that the intervention was carried out in was also limited,







included parents recording instances of physical aggression, verbal aggression, destructive behaviour and self-injury. In all studies these behaviours were operationalised further (for example, 'arm and hand biting', 'kicking', 'slapping', 'breaking'), in detail, depending on the precise pre-existing behavioural difficulties of the participants. Definitions of behavioural difficulties were assessed in WoE C, this included both breadth and depth of definition and all studies were rated 'medium' or 'high'.

To ensure appropriate rating and data collection, inter-rater reliability was assessed. This typically consisted of siblings (Singh et al, 2011A; Singh et al., 2011B), 'nannies' (Ahemaitijiang et al., 2020) or other trained professionals (Singh et al., 2021). Inter-rater reliability was conducted for all studies except Ridderinkhof et al. (2018) studies except iudieex



**Table 5.**

Table of effect sizes and WoE D ratings

<u>Study</u>	Outcome	Target Participant	Baseline – intervention effect		Follow up effect		WoE D
			Effect size	P value	Effect Size	P Value	

	C3	Tau-U = - 0.594** (Medium)	P=0.000	Tau-U = - 0.736** (Medium)	P=0.008
Frequency of physical aggression per week	C1	Tau-u = - 0.440** (Medium)	P = 0.003	Tau-U = - 0.926*** (Large)	P=0.030
	C2	Tau-u = - 0.529** (Medium)	P=0.000	Tau-U = - 0.830** (Medium)	

Singh et al. (2019)	Verbal Aggression	E1, E2, E3	Phi = 0.550*** (Large)	P<.001	-	-	2.3 (Medium)
	Physical Aggression	E1, E2, E3	Phi = 0.293** (Medium)	P = .003	-	-	
Ridderinkhof et al. (2018)	CBCL Externalising		r=-0.104* (Small)	P<.05	r=-0.206* (Small)	P<.01	2.12 (Medium)
	YSR externalising		r=-0.100* (Small)	Not sig	r=-0.291** (Small)	P<.05	

Note. Tau-U effect sizes = +/-0 to +/-0.31 (small); +/-0.32 to +/-0.84 (Medium)\*\*; +/-0.85 to +/-1 (Large)\*\*\*

Phi effect sizes = 0.1 (small); 0.3 (medium effect)\*\*; 0.5 (large effect)\*\*\*

R effect sizes = 0.1 (small); 0.3 (medium)\*\*; 0.5 (Large effect)\*\*\*







There are also limitations to the current systematic review. Critically, there is an overreliance on the Soles of the Feet MBI in the identified studies with only one study looking at Surfing the Urge (Singh et al., 2019) and MOached [Botto ( and)1010.5 -11.2 d (i)2.6 (nRc)-2 (e)]J0dder1010.5 -11

## References

Ahemaitijiang, N., Hu, X., Yang, X., & Han, Z. R. (2020). Effects of meditation on the soles of the feet on the aggressive and destructive behaviors of Chinese adolescents with autism spectrum disorders. *Mindfulness*, 11(1), 230-240.

Borquist-Conlon, D. S., Maynard, B. R., Brendel, K. E., & Farina, A. S. (2019). Mindfulness-based interventions for youth with anxiety: A systematic review and meta-analysis. *Research on Social Work Practice*, 29(2), 195-205.

Cachia, R. L., Anderson, A., & Moore, D. W. (2016). Mindfulness in individuals with autism spectrum disorder: A systematic review and narrative analysis. *Review Journal of Autism and Developmental Disorders*, 3(2), 165-178.

Carlson, L. E. (2016). Mindfulness-based interventions for coping with cancer. *Annals of the New York Academy of Sciences*, 1373(1)4 (1)-5.3 (1)4 (1(ndf)-17.5 (ul)2.6 (nel)2.6 8.283 0 T K)2 (.)00











Zenner, C., Herrnleben-Kurz, S., & Walach, H. (2014). Mindfulness-based interventions in schools—a systematic review and meta-analysis. *Frontiers in psychology*, 5, 603.



Appendix A: Details of Excluded Studies

Table A1. List of excluded studies at full review

Reference	Criteria Number	Rationale
<p>Hwang, Y. S., Kearney, P., Klieve, H., Lang, W., &amp; Roberts, J. (2015). Cultivating mind: Mindfulness interventions for children with autism spectrum disorder and problem behaviours, and their mothers. <i>Journal of Child and Family Studies</i>, 24(10), 3093-3106.</p>	<p>6</p>	<p>Observable behavioural outcomes not assessed</p>
<p>Drüsedau, L., Schoba, A., Conzelmann, A., Sokolov, A., Hautzinger, M., Renner, T. J., &amp; Barth, G. M. (2021). A structured group intervention (TütASS) with focus on self-perception and mindfulness for children with autism spectrum disorder, ASD. A pilot study. <i>European Archives of Psychiatry and Clinical Neuroscience</i>, 1-9.</p>	<p>5</p>	<p>Mindfulness not a central aspect to intervention</p>
<p>Singh, N. N., Singh, S. D., Sabaawi, M., Myers, R. E., &amp; Wahler, R. G. (2006). Enhancing treatment team process through mindfulness-based mentoring in an inpatient</p>		

**Appendix B: Details of Included Studies**

**Table B1.** Overview of the included studies: Mapping the Field

Study	Design	Participants	Type of Mindfulness-Based Intervention	Outcome variables	Country
Singh et al. (2011A)	A multiple-baseline single case experimental design	Three adolescents (14, 16, 17) with a diagnosis of ASD	Soles of feet delivered to young people	'Physical aggression' defined as hitting, kicking and biting	America
Singh et al. (2011B)	A multiple-baseline single case experimental design	Three adolescents (15, 13, 18) with a diagnosis of Asperger syndrome	Soles of feet delivered to young people	'physical aggression' defined as hitting, biting, scratching, punching, kicking, slapping, or destroying property	America
Ahemaitijiang et al. (2020)	A multiple-baseline single case experimental design	Three adolescents (14, 15, 17) diagnosed with mild levels of autistic behaviour	Soles of feet delivered to young people	Verbal aggression, physical aggression and destructive behaviours	China
Ridderinkhof et al. (2018)	Repeated measures design	45 children with ASD (8-19) and their parents, all children diagnosed with autism	Mymind – delivered to child and parents	Both internalising and externalising behaviour was measured parents reported child behaviour checklist or older children reported youth self report	Dutch
Singh et al. (2021)	A multiple-baseline single case experimental design	Three adolescents diagnosed with ASD (17, 19, 13)	Soles of feet – delivered directly to adolescents via zoom	Self injury hitting the head, face, and other body parts; arm and hand biting and self-pinching; and hand hitting and eye poking	America

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Singh et al. (2019)	Multiple baseline single case experimental design	Three adolescents diagnosed with ASD (16, 17, 17)	Surfing the urge – taught to adolescents	Verbal and physical aggression Verbal aggression was defined as yelling, screaming, cursing, or threatening physical harm to family members. Physical aggression was defined as kicking, hitting with a closed fist, biting, slapping, or punching family members.	America
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### Appendix C: WoE A Coding Protocols

Coding protocol: Ahemitijiang et al. (2020)

Coding Protocol: Single-Case Experimental Research Design

Adapted from Horner et al. (2005): The Use of Single-Subject Research to Identify Evidence-Based Practice in Special Education

Full Study Reference:

Ahemaitijiang, N., Hu, X., Yang, X., & Han, Z. R. (2020). Effects of meditation on the soles of the feet on the aggressive and destructive behaviors of Chinese adolescents with autism spectrum disorders. *Mindfulness*, 11(1), 230-240.

#### 1. Description of Participants and Settings

(a) Participants are described with sufficient detail to allow others to select individuals with similar characteristics (e.g., age, gender, disability, diagnosis).  
All quality criteria are met = 3

A majority of quality criteria are met = 2

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2. Dependent Variable

(a) Dependent variable is described with operational precision.

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

(b) Each dependent variable is measured with a procedure that generates a quantifiable index.

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

(c) Measurement of the dependent variable is valid and described with replicable precision.

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

(d) Dependent variables are measured repeatedly over time.

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

(e) Data are collected on the reliability or interobserver agreement associated with each dependent variable, and IOA levels meet the minimal standards (e.g., IOA = 80%; Kappa = 60%).

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

3. Independent Variable

(a) Independent variable is described with replicable precision.

All quality criteria are met = 3

A majority of quality criteria are met = 2

- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

5. Experimental control/internal validity

(a) The design provides at least three demonstrations of experimental effect at three different points in time.

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

(b) The design controls for common threats to internal validity (e.g., permits elimination of rival hypotheses).

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

(c) The results document a pattern that demonstrates experimental control.

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

6. External validity

(a) Experimental effects are replicated across participants, settings, or materials to establish external validity.

- All quality criteria are met = 3
- A majority of quality criteria are met = 2
- A limited amount of quality criteria is met = 1
- None of the quality criteria are met = 0

7. Social validity







Coding Protocol: Ridderinkhof et al. (2018)

Coding Protocol: Quantitative Studies



	Overall evidence rating (0-3)	Evidence Descriptors
Study Purpose	3	High
Literature	2	Medium
Design	2	Medium
Sample	1.5	Medium
Outcomes	2	Medium
Intervention	2.33	Medium
Results	2.5	Medium
WoE A: 2.19 (Medium)		



Note. <1.4 is low; 1.5-2.4 is medium; >2.5 is high

**Table D2.** An overview of the calculated WoE A scores and descriptors for each category identified in the Law et al. (1998) protocol

Category of the WoE Protocol							
Study	Study Purpose	Literature	Design	Sample	Outcomes	Intervention	Results
Ridderinkhof et al. (2018)							

**Appendix E: WoE B Coding Protocol**

**Table E1.** *Weight of Evidence B (WoE B): Methodological Relevance*

WoE B Rating (Qualitative Descriptor)	Criteria	Rational
3 (High)	Randomised Control Trails	
2 (Medium)	Cohort studies, quasi-experimental studies, single-case experimental designs, repeated measures design	Petticrew & Roberts (2003) constructed a typology of evidence to outline the appropriateness of different methodological designs to explore the effectiveness of a particular intervention
1 (Low)	Qualitative research, survey, non- experimental evaluation	

**Appendix F: WoE C Coding Protocol**

**Table F1.** *Weight of Evidence (WoE C): Topic Relevance*



Criteria	WoE Rating and descriptor	Rationale
Implementation of intervention	<p>3) Mindfulness training provided to participants by trained professional over a recommended time period/training provided by a professional</p> <p>2) Training delivered over a recommended time period but not by a trained professional/training delivered by author</p> <p>1) Training delivered for less than the recommended time period/training self-taught or unspecified</p>	<p>For a study to be relevant to the ‘question how effective is mindfulness-based intervention?’, the mindfulness intervention needs to have been implemented effectively (i.e high fidelity of training).</p>
Modification of Intervention	<p>3) Mindfulness-based intervention is implemented as intended – no modifications made to the intervention itself</p> <p>2) Some minor modifications were made</p> <p>1) Major modifications were made to the intervention</p>	<p>No modification is required in order to show that the intervention is effective when delivered in its intended form.</p>



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	1) Unspecified	
Long term efficacy	3) Effects maintained for 6 months or more after intervention 2) Effects maintained for between 3 months and 6 months after 1) Effect maintenance unspecified or maintained for less than 3 months	For the intervention to be effective there needs to be long term effects in reducing Behaviour difficulties. For studies to be relevant to question they need to show long term effectiveness.
Monitoring of intervention	3)The mindfulness technique used and applied by participants is monitored for its accuracy of implementation (e.g it is used at the right time and when using mindfulness, it is the mindfulness technique taught to them) frequently 2) It's monitored on occasion 1) It is not monitored/unspecified so assumed no monitoring has taken place	To ensure topic relevance, confidence that the MBI is being implemented by individuals at the appropriate times (i.e when angry) is important. Therefore, the correct implementation of the MBI by individuals should be monitored by researchers.

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**Appendix G: Overview of the WoE C Calculations**

**Table G1.** An overview of the WoE C scores across the different categories on the studies relevance to the topic

Study	Category from the WoE C Protocol					
	Implementation of Intervention	Modification of Intervention	Definition of behavioural difficulties	Confidence in Diagnosis	Long Term Efficacy	Monitoring of Intervention
Singh et al. (2011A)	2	3	1	2	2	3
Singh et al. (2011B)	3	3	1	2	1	3
Ahemitijiang et al. (2020)	3	3	3	3	2	3
Ridderinkhof et al. (2017)	3	2	3	3	3	3
Singh et al. (2021)	3	3	3	2	1	1
Singh et al. (2019)	3	3	2	3	1	2

Note. <1.4 low; 1.5-2.4 is medium; >2.5 is high

**Appendix H: Training Protocols**