

The Role of Mindfulness in Promoting Classroom Behaviour Among Children with Learning Difficulties

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ABSTRACT

This study examines the effectiveness of a culturally adapted mindfulness-based intervention (MBI) on classroom behaviour in two Chinese children with learning difficulties. Learning difficulties are neurological disorders that affect a child's ability to process and retain information, impacting their academic performance and emotional regulation. The prevalence of learning difficulties in China is significant, affecting 3% to 13% of school-age children. While MBIs have been shown to improve attention, emotional regulation, and overall well-being, a gap exists in research regarding their cross-cultural application. The study used a single-case design with pre- and post-intervention comparisons across a one-week baseline, a five-week intervention, and a one-week follow-up phase. Two 10-year-old participants, Case A and Case B, were selected based on poor concentration, low academic self-reliance scores, and teacher-reported disruptive behaviours. Data was collected through behavioural observations, teacher interviews, and parent interviews. The behavioural indicators measured were: the time required to enter a learning state (ST), the frequency of non-social behaviour (F), and the time wasted (WT). The results showed that the mindfulness intervention had a positive and lasting impact on the classroom behaviours of both participants. For Case A, all three negative behaviours (ST, F, and WT) decreased, with the most significant improvements seen in WT and ST, which remained low during the follow-up phase. Case B also showed continuous improvement across all three indicators, with the changes sustained during the follow-up period. Teacher and parent reports corroborated these findings, noting improvements such as decreased interruptions, increased task focus, and more active participation. These results suggest that culturally adapted MBIs can be successfully implemented in the Chinese educational context, confirming that cultural relevance is a key factor for the intervention's success and practical application.

KEYWORDS

Mindfulness-based intervention; Learning difficulties; Classroom behaviour; Cultural adaptation; Single-case study

1 Introduction

1.1 Background of learning difficulties and the rise of mindfulness interventions

Learning difficulties (LDs) can be referred to as neurological disorders that affect an individual's ability to store, process, or generate information ^[1]. These disorders can have profound effects on children's academic performance, emotional regulation, and social interactions. In China, the prevalence of learning difficulties is significant, affecting approximately 3 to 13% of school-age children ^[2]. This statistic highlights the urgency and importance of finding effective interventions within the Chinese educational system.

In recent years, Mindfulness-Based Interventions (MBIs) have gained widespread use as a crucial psychological intervention method in clinical settings, demonstrating remarkable efficacy, particularly in emotional regulation and mental health improvement ^[3]. MBIs have also been adapted to be used specifically with children. Studies indicated that mindfulness training in mainstream education improved children's mental health, well-being, self-regulation, emotions, and positive behaviour ^[4]. This trend reflects a broader movement towards integrating holistic, mind-body practices into the traditional educational framework.

1.2 Definition of mindfulness and mindfulness-based interventions

Mindfulness is a concept derived from Buddhist thought and practice, emphasising "remembering and lucid awareness" ^[5]. It has been widely applied to address various psychological challenges. Mindfulness-based interventions (MBIs) use formal and informal positive meditation exercises (combined with components of other therapies, including Cognitive Behavioural Therapy) designed to help clients become more aware of unhelpful patterns of thinking, feeling and behaving, and to help them develop a more accepting relationship with unwanted inner experience ^[6].

1.3 Understanding classroom behaviour

Classroom behaviour is defined as task-focused and socially appropriate actions during classroom activities, including sensitivity to the learning environment and the time required for the student to enter the learning state, frequency of non-social behaviours and waste of time.

1.4 Positive effects of mindfulness-based interventions

1.4.1 Effects on attention and cognitive process

Mindfulness-based approaches appear particularly beneficial for students with attentional difficulties. Research has

demonstrated that mindfulness-based therapies can effectively reduce inattention symptoms in individuals diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD) ^[7]. Given that learning difficulties are often accompanied by or exacerbated by attention deficits, the proven effect of MBIs in improving attention provides a direct theoretical basis for this study to explore their effectiveness in children with learning difficulties. This suggests a potential causal mechanism: improved attention can promote learning engagement, which in turn improves classroom behaviour.

1.4.2 Emotional regulation and stress reduction

Emotional regulation is managing and controlling one's emotional responses to different environmental stimuli. Difficulties in emotional regulation may lead to risks for anxiety, depression, social difficulties, and academic impairments. Research found that MBIs can help children with emotional regulation difficulties developing practical emotion regulation skills and enhance their overall functioning ^[8].

MBIs can be used to cope with the pressure that children may encounter during the developmental trajectory, especially during the transition from pre-adolescence, when children are exposed to increasing academic stress and peer pressure, which, if not under control, may lead to mental health issues ^[9]. Furthermore, MBIs may also have a positive impact on parents of children with learning difficulties. The study reported that MBIs may be appropriate for parents of children with LDs who are also under significant emotional and social stress due to their child's developmental issues[2]. By alleviating parental stress, MBIs create a more supportive ecosystem for the child, which may amplify the intervention's effect on the child's classroom behaviour.

1.4.3 Mindfulness and learning

Mindfulness can mitigate the negative effects of stress and attentional challenges on learning. A meta-analysis claims that MBIs may contribute to improved learning outcomes, and there are indications that the effects of MBIs may be sustained and particularly beneficial in some cases if MBIs include more training time and younger participants ^[10].

1.5 The present study

Despite the promising outlook for MBIs, there remains a research gap concerning their cross-cultural application, particularly their adaptability within the Chinese educational context. Interventions developed in Western cultures may not be directly transferable due to cultural differences, including learning styles, teacher-student interaction patterns, parental expectations, and Chinese societal norms regarding behaviour and emotional expression. Therefore, this study emphasizes "culturally relevant adaptations" as its core value. This focus on cultural effectiveness is not merely an additional consideration but is fundamental to ensuring the validity and practical applicability of the research findings. By focusing on cultural relevance, this study aims to ensure the effectiveness of the intervention within the Chinese cultural context and increase its likelihood of acceptance and successful implementation.

This study employs a single-case study design with pre- and post-intervention comparisons, providing a stable empirical basis for evaluating intervention outcomes and enhancing the scientific rigour and replicability of the findings. While single-case study methods may have limitations in generalizability, their strength lies in their ability to deeply explore individual responses, thereby providing targeted insights into intervention effects. The population of children with learning difficulties is highly heterogeneous, with significant individual differences in response to interventions. Large-scale quantitative studies often average out effects, thereby obscuring the unique trajectories of individual development. In contrast, single-case studies allow for in-depth analysis of individual change mechanisms and specific behavioral manifestations, providing valuable information for personalized educational strategies. This method offers significant value for personalized intervention approaches, which are often less appreciated in large sample studies. Furthermore, by focusing on specific classroom behaviors, this study further refines and complements the intervention's focus, which helps provide more practical findings for educators.

The core objectives of this study include:

To examine the impact of mindfulness-based interventions on classroom behaviors among children with learning difficulties.

To explore the sustainability of these behavioral improvements following the intervention.

To investigate the cultural effectiveness of mindfulness-based intervention.

2 Method

2.1 Participants

2.1.1 Basic information

Case A, male, 10 years old, receiving compulsory education in ordinary schools. The student has normal development of limbs and sensory organs and normal intelligence. The student is lazy in learning and often gives up halfway; he is easily affected by external changes and has poor concentration. He has a lively personality and communicates a lot with his parents. His mother is responsible for his daily studies.

Case B, female, 10 years old, receiving compulsory education in ordinary schools. The student has normal development of limbs and sensory organs and normal intelligence. The student has poor concentration in learning and likes to participate in cultural and entertainment activities. His mother is responsible for his daily studies.

2.1.2 Teachers' interview

Case A's teacher's description: A likes to interrupt the teacher in class and play with things that have nothing to do with the class. He likes to answer the teacher's questions, but they are not on point, mostly to attract the attention of classmates and disrupt the class order.

Case B's teacher's description: B likes to talk to classmates in class. When she is asked to sit alone, she often talks to herself. Her performance in class is not too bad. Sometimes she actively answers the teacher's questions, but most of the time she plays or talks by herself.

2.1.3 Researcher's observation

Case A likes to make noises in class, is not interested in what is being said, likes to interrupt the teacher and thinks he is very interesting. He is often punished to stand, and when he is punished, he will use various body movements to attract the attention of the students around him. A likes to make his own gun toys with paper, and he folds paper or plays with folded toys in class every day. He likes to play with his friends after class, and will wait until the bell rings before running back to the classroom. He will take the initiative to communicate with unfamiliar people and talk about his interests and hobbies, but will avoid learning problems.

Case B will listen and answer questions in class, but it is difficult to concentrate. On average, she will talk to people around her occasionally, especially in subjects she doesn't like, such as mathematics and science. She seems to be taking notes, but in fact, she is paying attention to the teacher's reaction and secretly writing and drawing. B likes music class very much and will take the initiative to take responsibility for maintaining discipline in music class. After class, she chats with her good friends and returns to her desk on time when the bell rings. She will not take the initiative to communicate with unfamiliar people but will take the initiative to answer questions.

2.1.4 Scale evaluation

The two cases were measured using the Self-Reliant Behaviour Scale for Children Aged 6-12 - Classroom Academic Self-Reliant Behaviour Subscale. Cases A and B scored 36 and 38 points, respectively, both lower than the class average ($M=42.33$ points).

2.1.5 Intelligence assessment

In order to eliminate the influence of intelligence on the level of academic independence, the Wechsler Intelligence Scale for Children (2-in-1) was used to test the cases. The two subtests of figure assembly and general knowledge were selected. The results showed that the simple IQs of cases A and B were 94 and 96, respectively, both of which were within the normal intelligence range.

2.2 Design

This study will use a single-subject case study with a mindfulness-based pre-and post-intervention study on three students' classroom behaviour. The observation and interview methods will be used to observe and evaluate their behaviour during the baseline, intervention, and follow-up periods. The interview method will interview participants' parents and teachers during the baseline period to understand the general situation of the participants, including the initial level of their grades and behaviour in the classroom. During the intervention period, weekly communication will be conducted with parents and teachers to understand participants' improvement of classroom behaviour and implementation of training. The test indexes of each period will be as follows: 1) sensitivity of learning environment and the time required for the student to enter the learning state (ST, accurate to minutes); 2) frequency of no-sociality behaviours, which records the number of meaningless behaviours in a specific period to complete a learning task (F); 3) waste time (WT): Observe and record the time wasted since the student enters the learning state to the end of the learning activity (class is over).

2.3 Intervention procedure

This study will use a single-subject case study design to examine the effects of a mindfulness-based intervention (MBI) on classroom scholastic self-supporting behaviour among two students with learning difficulties. The intervention will include three phases: baseline, intervention and follow-up. Behavioural observations and interviews will be conducted during each phase to assess changes over time. Before the study began, the researchers informed the parents of the individual cases of the research objectives, implementation steps, and research significance in detail, and signed an informed consent form with the parents.

2.3.1 Baseline phase (1 week)

During the baseline phase, the researcher will use an observation form to observe and record the participants' academic independent behaviour in the English classroom for 40 minutes every working day.

2.3.2 Intervention phase (4 weeks)

The mindfulness-based intervention (MBIs) will continue for 5 weeks, consisting of 15-minute group sessions running 3 times per week for a total of 5 weeks. Details about the MBIs can be found in Table 1^[11].

Table 1 Mindfulness training outline⁵⁴

Week	Lesson titles	Lesson content
1	Mindful bodies and listening	Practice still and relaxed sitting posture; concentrate attention on sound of a bell from sound start to finish; careful listening to ambient sounds in the classroom; following the breath; sending kind thoughts and wishes to other people we care about
	Mindfulness of breathing	
	Heartfulness: sending kind thoughts	
2	Body awareness	Whole body scan while noting feelings and sensations; teach "anchor word" to help stay connected with breath; discuss and visualize ways to be generous
	Mindfulness of breathing	
	Heartfulness: generosity	
3	Thoughts	Discussion about thoughts and the way thoughts dictate feelings and actions; practice mindful breathing and noticing when there are thoughts; looking around to find things with our eyes that we haven't noticed before; carefully observe one object; discussion and visualization of various instances and feelings on the playground
	Mindful seeing	
	Heartfulness: kind and caring on the playground	
4	Emotions: creating space	Discussion about emotions; identifying where in the body various emotions are felt; awareness of slow moving arms and standing up slowly; discussion and visualization of being grateful and how gratitude relates to feelings
	Slow motion	
	Gratitude: looking for the good	
5	Mindful walking	Slow mindful walking and noticing sensations; mindful eating of raisin exercise; discussion and visualization of feelings that come up before, during and after tests: how to apply mindfulness to these feelings during tests
	Mindful eating	
	Mindful test-taking	

2.3.3 Follow-up phase (1 week)

After the intervention, a one-week follow-up phase will be conducted to evaluate the sustainability of behavioural changes. Observations and interviews will be conducted using the same text as in the baseline phase. No additional mindfulness sessions will be delivered during this period.

3 Results

3.1 Behavioural changes across progress

This study provided a detailed profile for each participant, including their baseline characteristics and pre-intervention behavioural patterns. For case A, the ST, F, and WT data during the study period are presented in the Figure 1 below.

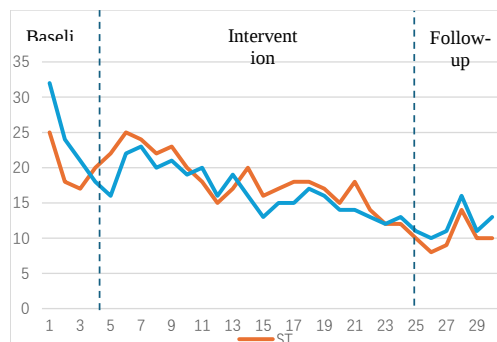


Figure 1 Case A's ST and WT

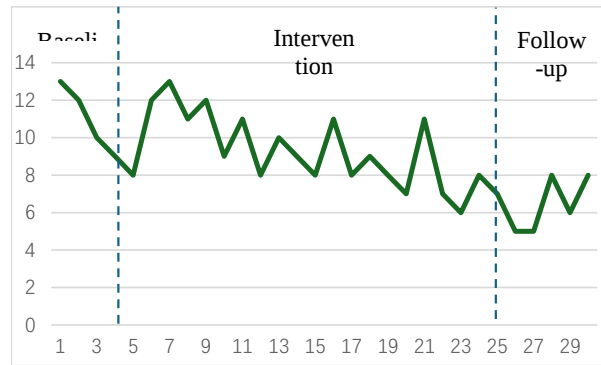


Figure 2 Case A's F

Figure 1 shows that Case A's behavioural performance, the intervention effects on different classroom negative behaviours varied after the mindfulness intervention. Overall, the frequency or time of all three negative behaviours (ST, F, WT) decreased, indicating an improvement in classroom behaviour. During the Baseline Phase, ST values fluctuated considerably, ranging from a minimum of 17 minutes to a maximum of 25 minutes, with an average of 20.4 minutes. This indicated unstable and relatively long times to enter a learning state. In the Intervention Phase, the average ST value decreased to 17.05 minutes, with a minimum of 10 minutes and a maximum of 25 minutes. This suggested that the time required to enter a learning state shortened after intervention began. And for the Follow-up Phase, the average ST value further significantly decreased to 10.2 minutes. Compared to the Baseline Phase, the average ST value decreased by approximately 10 minutes, indicating good sustainability of behavioural improvement. Apart from this, the frequency of non-social behaviours (F) was relatively high in the Baseline Phase, decreased to an average of 9.8 times in the Intervention Phase. And compared to the baseline period, the average F value decreased by approximately 4 times, demonstrating the positive effect of the intervention on reducing irrelevant behaviours. Wasting of time was also improved, with an average of 22.2 minutes in the baseline, reflecting low learning efficiency, to an average value of 12.2 minutes at the end of observation. This suggested a significant effect of the intervention on improving learning efficiency.

In summary, Case A's data indicate that after the mindfulness intervention, the most significant improvements were observed in "waste time" (WT) and "time required to enter learning state" (ST), both of which remained at low levels during the follow-up phase. These results suggested that mindfulness intervention has a positive and sustained impact on improving Case A's classroom negative behaviours.

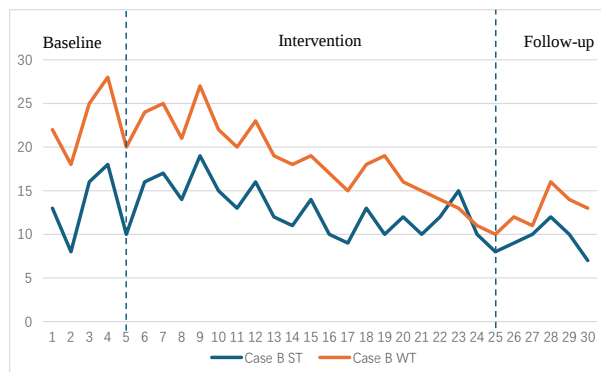


Figure 3 Case B's ST and WT

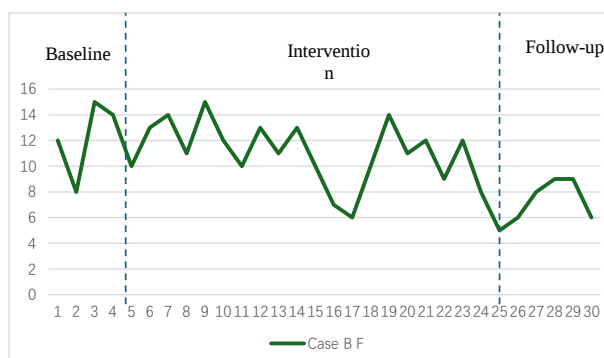


Figure 4 Case B's F

In Figure 3, from Case B's behavioural performance, MBIs also had a positive impact on classroom behaviour. In terms of ST, MBIs showed relatively noticeable effects. During the baseline phase, ST showed fluctuations, with an average of 13 minutes. In the intervention phase, the overall trend showed a shortening. By the follow-up phase, the average ST further significantly decreased to 9.6 minutes, with a minimum of only 7 minutes, indicating that the individual was able to enter a learning state more quickly and stably. F values also demonstrated a continuous improving trend. The average F during the baseline phase was 11.8 times, which decreased to 10.7 times during the intervention phase and further dropped to 7.6 times in the follow-up phase. This suggested that Case B's focused behaviours in the classroom increased, while the frequency of irrelevant behaviours decreased. Regarding WT values, the effect of the MBIs was obvious. In Figure 4, WT decreased from an average of 22.6 minutes during the baseline phase to 17.3 minutes during the intervention phase and further declined to 13.2 minutes in the follow-up phase. This reflects a continuous improvement in Case B's focus of attention.

Overall, both Case A and Case B showed varying degrees of reduction in the three classroom behaviour indicators (ST, F, WT) after the mindfulness intervention, and these improvements were well maintained during the follow-up phase. This suggested that MBIs had a positive and sustained impact on improving the classroom behaviours of children with learning difficulties.

3.2 Teacher's reports

According to the teacher's interview, Case A's teacher believed that Case A had improved significantly during the Intervention Phase and remained stable without practices. However, the teacher also pointed out that his condition rebounded mid-term but improved rapidly after reminders. His specific behaviours were below: 1) the number of interruptions to the teacher decreased; 2) the number and quality of answers to questions increased; 3) irrelevant movement in class decreased.

Case B's teacher reported that 1) a decrease in frequency of disruptive behaviours such as talking with desk mates, along with improved awareness of classroom rules; 2) enabled more active control of attention, as well as increased positive participation in teacher-student interactions and group tasks.

3.3 Parents' interviews

For the interview results with parents, Parent A believed that A made progress during the intervention period, as shown in the following: 1) the frequency of completing homework on time increased without parental reminders and supervision; 2) being more focused when studying; 3) actively communicating with parents about the content of learning; 4) actively meditation practices after the Intervention Phase.

Parent B believed Case B had shown positive changes in both classroom behaviours and home learning. Specific improvements include: 1) a noticeable reduction in distracted behaviours such as talking with parents or playing with objects when doing homework independently; 2) quickly return to tasks with minimal reminders and increased efficacy of learning.

4 Discussion

4.1 Interpretation of key findings

The study suggested that mindfulness-based interventions (MBIs) have a positive and lasting impact on the classroom behaviour of children with learning difficulties. The results showed a decreasing trend in all three observed classroom behaviours: time required to enter a learning state (ST), frequency of non-social behaviours (F), and waste of time (WT). For Case A, the most significant improvements were seen in WT and ST, with both remaining at low levels during the follow-up phase, indicating a sustained positive effect. Similarly, Case B showed continuous improvement in all three indicators, with the improvements maintained throughout the follow-up period. Teachers and parents' reports supported these quantitative findings, noting improvements such as decreased interruptions, increased task focus, and more active participation in classroom activities.

4.2 Attention and learning abilities

Mindfulness-based interventions (MBIs) promote learning by enhancing attentional control and executive functions. The practice of mindfulness trains the brain to regulate attention and reduce mind wandering and distraction. This intentional focus on the present moment, such as the breath, strengthens key cognitive skills^[12].

MBIs help children maintain focus on a single task over time. For both Case A and Case B, they improve attentional self-regulation, and MBIs can lead to better academic performance and learning outcomes. This is because a more focused mind is better equipped to process and retain information, leading to improvements in working memory and overall cognitive control. In addition to academic benefits, increased attention also allows children to better manage their impulses and engage more effectively in classroom activities and social interactions.

4.3 Cultural effectiveness

The findings suggest that these interventions, when culturally adapted, can be successfully implemented. The study's emphasis on "culturally relevant adaptations" was foundational to ensuring the validity and practical applicability of the research. Mindfulness originates from Buddhist culture, which is more consistent with the sense of happiness under the Chinese cultural values^[13]. Chinese culture emphasises discipline, collective norms, and academic achievement, which might provide children with stronger intrinsic motivation to reduce behaviours like "wasted time" and "non-social behaviours" that directly affect learning efficiency and classroom order. The successful outcomes of the intervention in this study suggest that MBIs developed in Western cultures are adaptable to different cultural settings, despite potential differences in learning styles, teacher-student interaction, and societal norms. This confirms that a focus on cultural relevance is not just an additional consideration but is fundamental to the intervention's success.

4.4 Limitations of the study

This study examined a single-case study design, which allowed for an in-depth analysis of individual change mechanisms and specific behavioural manifestations. This approach is particularly valuable for a heterogeneous population like children with learning difficulties, as it provides targeted insights into intervention effects that might be obscured in large-scale quantitative studies. The pre- and post-intervention comparisons provide a stable empirical basis for evaluating the outcomes and enhancing the study's scientific rigour. As there was no control group, the changes in participants' scores that we observed between pre- and post-intervention may not be attributed solely to the mindfulness intervention. This study may be influenced by the external environment, like exams or teachers' attitudes.

However, the limitation of a single-case study design is the lack of generalizability. While the findings provide significant value for personalised intervention strategies, they cannot be broadly applied to the entire population of children with learning difficulties in China. The study's small sample size of two participants, while ideal for in-depth analysis, limits the ability to generalise to the broader population. Improving MBIs with Chinese culture is necessary. The combination of mindfulness and culture, accompanied by cultural reflection and cultural awareness, forms an adaptive methodology for in-depth and systematic recognition, understanding, and development of culture^[14]. Future research should consider a larger sample size to confirm these findings and explore the effects of MBIs across a more diverse group of children with learning difficulties. Additionally, incorporating a control group in future studies would further strengthen the causal claims.

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