Mindfulness: Is it the missing link in the Australian Student Wellbeing Framework?

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Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

Signed

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Date 14/04/2022

Abstract

The Australian Student Wellbeing Framework (ASWF) is a new addition to the standards and protocols teachers are required to meet, designed to create the best foundation for students to reach their aspirations, through supporting their wellbeing. The ASWF provides resources for teaching students *about* wellbeing, but lacks practical activities to improve wellbeing. Mindfulness is becoming increasingly popular in the literature due to its well-established connection to wellbeing and other positive outcomes of its practice. The objective of this study was to determine if a school-based mindfulness intervention would be beneficial to secondary student wellbeing and support academic performance, as part of the ASWF. The qualitative study took the form of a systematic review, in which 16 papers reporting on school-based mindfulness interventions were analysed. These articles were assessed for quality, prior to inclusion, using the MMAT and CRAAP test. The participants were secondary school-aged students from a variety of different backgrounds: culturally, linguistically, socio-economically, and geographically. Thematic analysis was conducted, and seven overarching themes emerged: academic performance, goal setting and relevance to life, interest in program and engagement, intervention delivery, emotional and behavioural changes, self-improvement and progress, and attention, awareness, and concentration. These themes identified key components of school-based mindfulness interventions. Improvements in student academic performance were found to be related to mindfulness interventions. Interestingly, goal setting was an important component to student engagement and the effectiveness of the intervention, this allowed students to see practical applications for the skills they were learning and how they were relevant to their daily lives. The interest students had in the program was related to their engagement and attendance, which led to reduced problematic behaviour and improved academic performance. The intervention delivery, with multiple sub-themes, provided valuable information; student comments and research findings were used to determine the best method for implementing a mindfulness intervention in secondary schools. The positive emotional and behavioural changes, which occurred as a result of the mindfulness intervention, led to greater student resilience and wellbeing. Moreover, there was less need for behaviour management, with a consequent increase in teaching and learning time, resulting in improvements in the teaching and learning environment. Students experienced improved self-concept, in all areas including academics, leading to more positive attitudes towards their own ability to learn. As a result of the mindfulness intervention, students experienced increases in selective attention and the capacity to divert focus away from distractors, as well as consequent improved academic outcomes.
This study concludes with recommendations for mindfulness interventions in secondary schools, including a practical resource for teachers and schools to foster student wellbeing and improved academic performance, as part of the ASWF.

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Chapter 1: Introduction

In 2020, only 56% of Australian young people felt positive about their future and 26.6% reported experiences of psychological distress (AIHW, 2021). This level of psychological distress in Australian youth has been generally increasing over time (2012-2020; Brennan et al., 2021). Psychological distress is known to negatively impact student mental, physical, and academic wellbeing, and is connected with poor academic performance (McGillivray & Pidgeon, 2015). For these reasons, student wellbeing is becoming increasingly important in the Australian education system (DESE, 2020). Educational research is demonstrating the influence of schools on student wellbeing and academic performance (Clement, 2010). Neuroscience is enhancing the understanding of wellbeing, revealing an inseparable interaction between cognition, affect and social context, and the resulting impact on thought, reasoning, judgement, and actions (Clement, 2010). Student connectedness to school and having a sense of belonging contribute to social and personal development, physical and mental health, school achievement and protective factors against conduct problems and risky behaviours (Clement, 2010). This connectedness is facilitated by a whole school approach encompassing classroom and school climate and is influenced by organisational and administrative processes and policies, the community context and school partnership with the community, and the physical ambiance of the classroom (Clement, 2010).

The Australian Student Wellbeing Framework (ASWF), in its current form, was introduced for schools in 2020 (DESE, 2020). The ASWF is designed to support Australian schools to provide all students with the best foundation to reach their aspirations in learning and life (Education Council, 2020). It is based on the evidence which demonstrates the relationship between wellbeing, safety, and learning (Education Council, 2020). Student wellbeing and learning have been shown to be enhanced when they feel connected, safe, and secure in their environment, as students are more likely to be active participants in their learning and achieve better outcomes, physically, emotionally, socially, and educationally (Education Council, 2020). The ASWF has five elements which are believed to intertwine to create a positive school culture and support wellbeing; these are leadership, inclusion, student voice, partnership, and support (Education Council, 2020). Support is the element which relates most to the purpose of this study, as one of its practices is to *"Embed wellbeing and support for positive behaviour strategies that are evidence-informed, promote resilience and align with the needs of the school community"* (Education Council, 2020, p.11).

Wellbeing
Wellbeing as a concept is difficult to define, there are many theoretical descriptions of what wellbeing is, and it has many uses across a broad range of fields (CESE, 2015; Clement, 2010; Dodge et al., 2012; Fraillon, 2004; Soutter, 2011). The definition is largely disputed dependent on the research study and its purpose, and the theoretical approach to wellbeing, but generally speaking wellbeing can be described as the absence of negative conditions or the prevalence of positive attributes (CESE, 2015; Clement, 2010; Dodge et al., 2012; Fraillon, 2004; Soutter, 2011). A multi-disciplinary study conducted by Dodge et al. (2012) explored the varying approaches to wellbeing to form a definition. This included Aristotle's concept of eudaimonia, human flourishing, which highlights wellbeing as positive psychological functioning and development and the hendonic approach of happiness and life satisfaction and accounted for the inter-disciplinary problem of wellbeing and quality of life being used interchangeably. It also considered the term wellbeing being used not only by researchers but commonly also by the lay person (Clement, 2010; Dodge et al., 2012). The definition found as a result of Dodge et al.'s (2012) study has been selected to define wellbeing as it is universal in nature and can be applied to people regardless of their age, gender, or culture. For the purpose of this study, wellbeing is defined as *the balance point between an individual's psychological, social, and physical resources and the psychological, social, and physical challenges they face* (Dodge et al., 2012).

In the education setting, wellbeing is key for two reasons: the recognition that schooling is not just about academics and that students who have higher levels of wellbeing tend to have improved cognitive outcomes at school (CESE, 2015). Student wellbeing, therefore, cannot be viewed in seclusion from the larger school context (Fraillon, 2004). Schools have a critical role in promoting the physical, social, emotional, intellectual, moral, and spiritual development and wellbeing of Australian students (CESE, 2015). Schools provide a setting for student wellbeing and providing a safe school environment is about not only maintaining physical safety, but also emotional safety, through fostering positivity and an environment free from destructive behaviours, such as bullying, which negatively impact mental health (CESE, 2015; Fraillon, 2004). A student's sense of connectedness to school is beneficial to student wellbeing, and results from the quality of the relationships between students and their teachers, students and the school, between students, and schools and the local community (CESE, 2015). Wellbeing is a holistic concept, and promotion of student wellbeing requires a whole-school approach (CESE, 2015). Schools can provide protective factors as well as the skills, knowledge and understanding to enhance student wellbeing, and are in a prime position to embrace and benefit from the reciprocal relationship between engagement, wellbeing, and academic performance (CESE, 2015).

Wellbeing and academic performance
Wellbeing is not only an achievement enhancer, but student wellbeing also has its own educational value (Clement, 2010). The development of high levels of cognitive skill is impacted by the physical and emotional wellbeing of the body (Clement, 2010). Studies such as Palos et al. (2019) demonstrate a relationship between student wellbeing and academic performance. Many studies acknowledge this relationship (Dix et al., 2011; Dekker et al., 2020; Egan et al., 2021; González et al., 2021; White & Kern, 2018). There is evidence which demonstrates that students with a continuous feeling of internal distress, such as sadness, apprehension, and depressiveness, show a reduction in academic functioning, and students with external distress, including aggression, frustration, and phobias, demonstrate academic difficulties such as a delay in learning and poor academic success (Bukhari & Khanam, 2017). An increase in student wellbeing has been found to be associated with improved academic performance (Bücker et al., 2018; Dix et al., 2011; Topham & Moller, 2011), and high academic performance is correlated with high levels of student wellbeing (high engagement and low burnout; Palos et al., 2019). Martínez et al. (2019) found that student wellbeing, in the form of engagement, was significantly associated with academic success; academic performance (GPA) and satisfaction.

Wellbeing is well known to be related to improvements in academic performance; however, there are many mediating and moderating factors which have been discussed in literature, such as physical activity, motivation, perseverance, anxiety, growth mindset, student perception of teacher, counselling/support, and school engagement (Bailey & Phillips, 2016; Clement, 2010; Kayani et al., 2018; Martínez et al., 2019; Topham & Moller, 2011; Van Petegem et al., 2006; White & Kern, 2018). Bücker et al. (2018) acknowledge that the heterogeneity of their results indicates a moderating effect of a third variable, consistent with the other findings discussed above. There are findings to demonstrate a positive relationship between subjective well-being and academic performance, through measures of happiness and life satisfaction (Bukhari & Khanam, 2017).

Earlier research has demonstrated that higher levels of student motivation and desire to learn are correlated with higher levels of student wellbeing (Clement, 2010). Teacher 'care and concern' has also been found to have positive effects on student wellbeing, motivation, and academic performance (Clement, 2010). Research has shown an indirect link between wellbeing and academic performance, through motivation (Clement, 2010); in contrast, recent research has found that motivation appeared to have no direct effect on academic performance (Fernandez-Perez & Martin-Rojas, 2022). This uncertainty leaves space for other potential mediating factors.

Wellbeing and mindfulness

Mindfulness is a practice of being aware of the present, both the external world and internal world, purposefully and without judgement (Franco et al., 2010; Lopez-Gonzalez et al., 2018; Ma & Fang, 2019; McGillivray & Pidgeon, 2015; Parto & Besharat, 2011). The practice of mindfulness is designed to support one to approach their internal experiences with acceptance, curiosity, and openness (Franco et al., 2010; Parto & Besharat, 2011). Mindfulness is known to enhance adaptive coping skills to stressful events, through self-regulation of attention to immediate experiences and abandonment of efforts to control negative thoughts, rather acknowledging that they are present, and realising distressing thoughts are not always true representations of reality (Coffey & Hartman, 2008; Keye & Pidgeon, 2013). Mindfulness has two fundamental components: self-regulation of attention and acceptance and non-judgemental attitude (Boo et al., 2020). It is important to note the difference between acceptance, as used in mindfulness, and resignation; acceptance suggests the simple acknowledgement of present experiences whilst resignation implies surrender or submission (Felver et al., 2013).

Mindfulness is becoming an increasingly popular topic in research due to the emerging relationship with mental health (Ma & Fang, 2019). This is not only due to calming and stress-reducing properties of mindfulness, but also the cognitive benefits of improved memory, attention, and executive functioning (Canby et al., 2015). Increased mindfulness has been found to be associated with reduced levels of stress, anxiety, depression, neuroticism, rumination/worry, and secondary distress, and improved body satisfaction (Bergen-Cico et al., 2013; Chen et al, 2018; Franco et al., 2011; Ma & Fang, 2019; Masuda & Tully, 2012). Mindfulness is related to decreased levels of psychological distress and increased levels of health, wellbeing, and life satisfaction (Chen et al, 2018; Ma & Fang, 2019; Masuda & Tully, 2012; Slonim et al., 2015). Mindfulness-based programs have been developed as a way to reduce stress and improve wellbeing (Micklitz et al., 2021; Schussler et al., 2020).

The concept of mindfulness originates from Buddhism, which emphasised a close and constant connection between attention and memory functions, and concerns the capacity for continuous discriminative attention, without forgetfulness or distraction, for encoding and recollecting experiences (Shonin et al., 2016; Thera, 1962; Vago & Silbersweig, 2012). It is often a misconception that all mindfulness is a form of Eastern religious practice, more specifically Buddhism (Felver et al., 2013). Whilst mindfulness is central to Buddhist models of wellbeing, with meditation being at the heart of the practice, it can be practised in a secular context without spiritual or religious purpose (Coffey & Hartman, 2008; Felver et al., 2013; Miralles-Armenteros et al., 2021; Tekel & Karadag, 2020). Psychology has adopted, or formed, a secular practice of mindfulness to increase mental processes and respond skilfully to emotional distress and maladaptive behaviours, with a focus on fostering wellbeing and minimising (Shonin et al., 2016; Vago & Silbersweig, 2012). This secular practice is considered to be a Western approach to mindfulness (Schmidt, 2011).

Mindfulness practices, in the 'Western' or secular form, can have significant benefits for both mental and physical health, through stress reduction, increased relaxation, improved sleep, decreased emotional distress, increased positive affect, more positive mental states, improved wellbeing, and better quality of life (Greeson, 2009; Huppert & Johnson, 2010; Lomas et al., 2017; Rybak, 2013). It was once thought that meditation was similar to relaxation (Beauchemin et al., 2008), but EEG patterns have revealed that unlike relaxation, when in a state of mindfulness, alertness increases rather than decreases (Franco et al., 2011). Mindfulness requires concentration to remain alert and lose focus of the content of thought, without losing awareness or clarity (Franco et al., 2011). Mindfulness can benefit wellbeing through the development of skills in attention and awareness, leading to enhanced emotional regulation, that serves multiple health and wellbeing outcomes (Lomas et al., 2017). Mindfulness practice has been found to improve chronic pain,

increase immunity, decrease stress and unhealthy behaviours such as smoking, increase sleep, and decrease depression, anxiety, and addictive behaviours (Creswell, 2017). Practices which facilitate mindfulness, such as meditation, yoga, and breathing techniques, are being used to support youth in clinical and non-clinical populations, with the aim of remedying problems, alleviating risk, and promoting wellbeing (Gueldner & Feuerborn, 2015; Huppert & Johnson, 2010). Mindfulness improves attention, working memory and problem solving (Creswell, 2017).

Mindfulness and positive behavioural changes

As previously stated, the Support component of the ASWF is to *"Embed wellbeing and support for positive behaviour strategies that are evidence-informed, promote resilience and align with the needs of the school community"* (Education Council, 2020, p.11). In addition to its relationship with wellbeing, mindfulness can lead to positive behavioural changes (Dekeyser et al., 2008; Donald et al., 2019). These include improvements in emotional regulation, attention, prosocial behaviours, and impulse control, as well as increased calmness, compliance, and relaxation and decreased tiredness and aggression (Bostic et al., 2015; Cairncross & Miller, 2020; Dekeyser et al., 2008; Donald et al., 2019; Tang et al., 2015).

Mindfulness doesn't only benefit neurotypical students; there have also been improvements and benefits for students with ASD and ADHD (Cachia et al., 2016; Cairncross & Miller, 2020; Hartley et al., 2019; Zylowska et al., 2008). With nearly 3% of children aged 10-14 and approximately 2% of those aged 15-19 diagnosed with ASD (AIHW, 2017), and ADHD affecting 6.3% of children aged 12-17 (AIHW, 2020), this is an important benefit of mindfulness for the classroom environment. Mindfulness has been found to benefit adolescents with ASD through a reduction in rumination, improvements in social cognition and communication, and reduce preoccupations (Cachia et al., 2016). It can also reduce aggression and self-injurious behaviours, and improve wellbeing, mitigating interpersonal and mental health issues in those with ASD (Hartley et al., 2019). Mindfulness has seen significant pre-post intervention improvements in depression, performance on cognitive tasks, attention, and emotional regulation in people with ADHD (Zylowska et al., 2008). Mindfulness interventions have also been shown to improve symptoms of ADHD, with decreased inattention and a significant reduction in hyperactivity and impulsivity (Cairncross & Miller, 2020; Zylowska et al., 2008).

Mindfulness-based practices show promise for use in schools to promote academic, social, and emotional growth (Gueldner & Feuerborn, 2015).

Mindfulness and academic performance

Schools value skills such as critical thinking, problem-solving, communication, and creativity which are necessary in the global society we live in today, but an increasing body of evidence demonstrates that social and emotional skills influence academic performance and are considered to be the missing link to academic success (Balasubramanian & Al-Mahrooqi, 2016; Elias, 2006; Gueldner & Feuerborn, 2015; Lai & Hwang, 2014). This is what can be referred to as educating the "whole child", and is far from a new concept, being ingrained in many ancient cultures (CESE, 2015; Elias, 2006 p.5). In a recent study by Fernandez-Perez and Martin-Rojas (2022), it was found that there are two interpersonal emotional competencies which are key to students improving their academic performance; these were self-awareness and self-regulation. Mindfulness is known to increase self-awareness and self-regulation, and one model of mindfulness puts self-awareness and self-regulation as two key components of mindfulness itself (Leyland et al., 2019; Verhaeghen & Aikman, 2019).

There is research which demonstrates a relationship between increased mindfulness and improved academic performance in university students (Egan et al., 2021; Goretzki & Zysk, 2017). There is

much debate surrounding the reasons for this association between mindfulness and academic outcomes; these include enhanced cognitive abilities, such as attention and memory (Boo et al., 2020; Caballero et at., 2019; Miralles-Armenteros et al., 2021), improved classroom climate (Lopez-Gonzalez et al., 2018), increased executive functioning (Schonert-Reichl et al., 2015; Thierry et al., 2016), improved attitude and social-emotional abilities (Caballero et at., 2019; Schonert-Reichl et al., 2015), decreased propensity to ruminate and fixate on distressing thoughts (Boo et al., 2020), and increased compassion and engagement (Miralles-Armenteros et al., 2021). Despite the uncertainty regarding the reasoning, research suggests that mindfulness could be an important factor in academic performance (e.g., Caballero et at., 2019; Franco et al., 2011; Miralles-Armenteros et al., 2021; Schonert-Reichl et al., 2015; Thierry et al., 2016).

Whilst the majority of research indicates that a school-based mindfulness intervention would support student wellbeing and improve academic performance (e.g., Caballero et at., 2019; Franco et al., 2011; Miralles-Armenteros et al., 2021; Schonert-Reichl et al., 2015; Thierry et al., 2016), there are some findings to suggest that there was no significant impact of the mindfulness intervention on early adolescents (Carsley et al., 2017), that neurocognitive maturity may play a role in effectiveness across age groups (McKeering & Hwang, 2019), and that some students have reported experiences of feeling that mindfulness interventions were disadvantageous to their academic outcomes (Boo et al., 2020).

There is no clear evaluation of the literature on school-based mindfulness interventions for adolescent students in relation to wellbeing and academic performance, which leads to the current study. This study aims to address the question: *is mindfulness the missing link between student wellbeing and academic performance, as part of the Australian Student Wellbeing Framework?* and form a set of recommendations for implementing mindfulness into the classroom setting.

The current study

Mindfulness has captured educational researchers' attention due to its potential to enhance academic and behavioural outcomes (Boo et al., 2020; Caballero et al., 2019; Canby et al., 2015; Schonert-Reichl et al., 2015), and schools provide an essential access point for the delivery of health and wellbeing programs to be provided to all students (McKeering & Hwang, 2019). Mindfulness-based practices are designed to create a fundamental shift from awareness of the content of the experience to an objective observation, which impacts other psychological processes, and could be implemented as a stand-alone prevention effort (Felver et al., 2013).

An increased level of wellbeing is known to improve academic performance (Bücker et al., 2018; Clement, 2010; Dekker et al., 2020; Egan et al., 2021; González et al., 2021; Palos et al., 2019), and there is already a well-established relationship between mindfulness and wellbeing (Micklitz et al., 2021; Schussler et al., 2020; Vago & Silbersweig, 2012). Mindfulness interventions are seen to improve stress, emotion regulation, and ability to perform cognitive tasks in adolescents (Schussler et al., 2020).

There is evidence to suggest that mindfulness could improve academic performance through the elements of self-awareness and self-regulation (Leyland et al., 2019; Verhaeghen & Aikman, 2019). This improvement in academic performance could also occur through cognition domain changes, such as attention, where mindfulness has been found to have the most substantial impact on students' achievement (Šouláková et al., 2019). Thus, this study aims to determine if a school-based mindfulness intervention would be a successful method to improve secondary student academic performance, as part of the ASWF. There are resources and guides, and professional development courses available to support teachers and schools to implement the curriculum within the ASWF (DESE, 2020), yet there are no resources to support teachers to implement classroom practices to improve wellbeing, only to teach *about* wellbeing. This gap in implementation is that which this study aims to fill.

The definition of wellbeing above, by Dodge et al. (2015), will allow for the inclusion and comparison of articles which may follow different theoretical backgrounds or approaches to wellbeing.

Defining academic performance is no easy feat; there is a lot of uncontrolled variation in academic performance criteria across studies (Lavin, 1965). Academic performance can be measured by factors such as grades and achievement scores, GPA, engagement in the form of homework completion, and executive functioning which is a strong predictor of academic success in adolescents (Lavin, 1965; Lee & Shute, 2010; Mason, 2017; Samuels et al., 2016; York et al., 2015). Another way of defining academic performance is in the form of over- or under-achievement, but this, too, presents with its own challenges, as ability needs to be accounted for in terms of differentiating between low ability over-achievers and high ability under-achievers (Lavin, 1965). Due to the nature of this study and the limited research in this field, any measurement of academic performance (stated as such) will be included. In addition to this, again due to the limited research in this area, executive functioning will be accepted as a measure of academic performance, as there is a strong association between the two domains in students, particularly between working memory and academic performance (Gunzenhauser & Nückles, 2021; Cortes Pascual et al., 2019).

Mindfulness as a concept is becoming increasingly popular in our society, but there is no single definition or version of mindfulness which takes authority (Vago & Silbersweig, 2012). Mindfulness can be described as a temporary state of attention and awareness which is without judgement, reactivity, and is present-centred, as a trait which involves dispositional cognition, emotion, and behavioural tendencies, as a meditative practice, or an intervention (Vago & Silbersweig, 2012). Mindfulness interventions are of varying types and there is no one way to implement mindfulness (Creswell, 2017; Zoogman et al., 2015). Mindfulness interventions include Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Therapy, brief mindfulness interventions, mindfulness mobile applications, and mindfulness-related interventions where and include tasks such as mindfulness meditation, body scan, walking meditation, mindful eating (Creswell, 2017; Zoogman et al., 2015). To gain a real perspective into the effects of school-based mindfulness interventions, any study which uses an in-school mindfulness intervention will be considered for inclusion in the study.

This study intends to fill the gap in the ASWF and investigate the effects of a school-based mindfulness program on high-school students, with a focus on wellbeing and academic outcomes. The Western, or secular, approach to mindfulness will be used to ensure findings are relevant to Australian schools and avoid any potential issues with conflicting religious practices or beliefs.

Chapter 2: Methodology

Theoretical framework
Research is an amalgamation of experience and reasoning and is regarded as the most successful approach to discovering the truth (Cohen et al., 2018). Ontologically speaking, an inductive-deductive approach is used in this study. The inductive-deductive approach is a combination of Aristotle's deductive and Bacon's inductive approaches to research (Cohen et al., 2018). This approach requires a back-and-forth process between induction (observation to hypothesis) and deduction (hypothesis to implication; Cohen et al., 2018). The research will be systematic and controlled, and empirical (Cohen et al., 2018). This allows for subjective, personal beliefs to be balanced against objective evidence (Cohen et al., 2018). Ontology as a philosophical principle refers to the nature of reality and this concept that interest shapes beliefs and values, and these are socially constructed, privileging some views and underrepresenting others as a result (APA, 2022;

Cohen et al., 2018). Thus, it must be acknowledged that the researcher brings to this study a personal interest and investment in this research. As a provisional psychologist with a particular interest in mindfulness-based therapeutic approaches, the researcher owns an unconscious bias may be present in the interpretation of the data. This researcher bias occurs in investigative projects either within the research process or interpretation of results and is attributed to the researcher's expectancies or preconceived beliefs (APA, 2022). An effort is made to minimise this bias through the implementation of other methodological approaches.

Epistemology as a philosophical concept refers to the very basis of knowledge; its nature, origin, and limitation (APA, 2022; Cohen et al., 2018). This study adopts an epistemological approach of subjectivism. Subjectivism is one form of research methodology which is used to uncover knowledge about social behaviour (Cohen et al., 2018). The subjective epistemological approach to research revolves around the search for meaningful relationships and the discovery of action and consequence (Cohen et al., 2018). The subjective approach views the social world as a personal, humanly created and requires a qualitative approach (Cohen et al., 2018). From a change perspective, subjectivism revolves around determining the values embodied in the organisation and changing their views or values to initiate change (Cohen et al., 2018). This seemed relevant to this study through beneficence (Cohen et al., 2018), as the purpose is designed to guide and change peoples' perspectives on the ASWF and how to create the most benefit for students.

In line with the ontological and epistemological approaches discussed above, the study conducted is a qualitative study in the form of a systematic review (Cohen et al., 2018). This research is qualitative in nature as enquiry is a focus, it does not have a hypothesis, and has the intention to understand how and why factors lead to an outcome, rather than statistical analysis, or correlations (Cohen et al., 2018). A systematic review requires the author to follow criteria for searching, inclusion/exclusion of studies, acceptable methodology, and relevance (Cohen et al., 2018). Researchers are required to use explicit, rigorous, and transparent methodology applied systematically (Cohen et al., 2018). Systematic reviews require techniques to minimise bias (Cohen et al., 2018), for this reason the guidelines for Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) were consulted throughout the systematic review (Moher et al., 2015). Thematic analysis will be the form of data analysis utilised within this qualitative study (Cohen et al., 2018). This systematic review is intended to answer the following research question and be relevant and useful to readers (Cohen et al., 2018).

> *"Is mindfulness the missing link between student wellbeing and academic performance, as part of the Australian Student Wellbeing Framework?"*

The study also aims to make a set of recommendations for schools and teachers about how mindfulness could be utilised within the classroom setting, within the scope of the ASWF.

Ethics

Ethical Approval: This study only includes research conducted in accordance with the ethical standards of the institution or committee, and the *National Statement on Ethical Conduct in Human Research* (ARC, 2018) or relevant and comparable ethical standards.

Informed consent: Requirement of informed consent is waived in this study due to clause 2.3.10*c* & 2.3.10*e* (ARC, 2018).

Assessment of Risk and Benefit: There is no perceived risk of this research study.

Research misconduct: This research has been conducted ethically, with best effort to avoid any falsification, fabrication, or plagiarism (Kuroki, 2018).

Conflict of interest: The author declares there is no conflict of interest.

Search strategy

A search was conducted in the electronic databases A+ Education, ERIC, PsycINFO, PsycARTICLES, ResearchGate, Scopus, and PubMed. The following search terms were used: (mindful* OR mindfulness) AND (school* OR lesson* OR classroom* OR education*) AND (student* OR adolescen* OR youth*) AND (intervention* OR program*) AND (academic* OR learn* OR achievement*) AND (wellbeing OR wellness OR mental health). A search in the JSTOR and ScienceDirect electronic databases was also attempted but unfortunately the systems did not have the capacity to include all search terms. A search for articles in the journal 'Mindfulness' was also conducted using the same search terms, as well as a manual search of the reference list of included articles identified in the database search.

The results from the database search showed a clear prominence for research in university settings, as well as a large body of literature investigating mindfulness interventions in elementary or primary school. The original age range for the search was Year 7-12, aged between 12 and 19 years old, which is considered to be high school in Australia. However, this was not able to be maintained due to the limited research available and literary gap. A new age range was defined considering the literature from United States of America, where students in Year 6 are in junior high school at an age of 11-12 years (Martinez et al., 2011). The researcher considered this to be a reasonable adjustment to maximise the literature for review, whilst still maintaining the integrity of the study.

The inclusion criteria for the literature search was: a) peer-reviewed journal article, b) English language, c) participants are secondary school aged (year/grade 6-12), d) mindfulness was the main form of intervention, e) the intervention occurred in the school setting, f) the study utilised a secular (western) form of mindfulness, g) students were not selected due to any clinical diagnoses and h) the results included a reference to academic performance. See figure 1 for the PRISMA model of this study. The peer-reviewed journal article criterion was determined to ensure that scientific rigour was upheld, and the restriction to English language was included to guarantee that the papers could be comprehended and interpreted by the researcher. The literature was screened to ensure the participants were in high school and that the main component of the intervention was mindfulness-based, rather than another intervention, such as a concentration/attentional intervention, which then measured levels of mindfulness. Programs that included other elements were included, providing the main component of the intervention remained mindfulness based. To be included, the main intervention in the program needed to be implemented within the school environment.

To be relevant and applicable to the Australian public and private school systems, it was ensured that the interventions remained secular and did not include any religion-based mindfulness practice. Thus, the articles were required to use a 'western' form of mindfulness. To make this study as beneficial to the Australian classroom as possible, studies which targeted students with behavioural or learning challenges where included, providing the population had no clinical diagnoses, such as in Beauchemin et al. (2008) who had a population with learning disabilities, yet defined by low academic performance. And the final criterium of academic performance results was included to ensure relevance to the research question. The final sample of the study was 16 papers of qualitative, quantitative, and mixed method design.

Quality analysis

This study yield results of a quantitative, qualitative, and mixed-method nature. The Mixed Methods Appraisal Tool v2018 (MMAT) was used to assess the quality of and to critically appraise the studies found in the literature review before inclusion in the systematic review (Hong et al., 2018). The MMAT has been revised to improve validity and assessed for reliability (Hong et al.,

Figure 1.

PRISMA model.


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┌─────────────────────────────────┐
│ Articles identified in database search │
│              2887               │
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             │
             │      ┌─────────────────────────────────┐
             │      │ Articles excluded on initial analysis │
             ├──────│              2667               │
             │      │                                 │
             │      │ Not peer-reviewed journals 384  │
             │      │   Non-English language 5        │
             │      │     Population 2278              │
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│    Articles to read abstract    │
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             │      │ Articles excluded on secondary analysis │
             ├──────│              115                │
             │      │                                 │
             │      │    Main Intervention 74         │
             │      │  Intervention not in school 40  │
             │      │   Participant selection 1       │
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│        Articles to read         │
│              105                │
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             ├──────│       Duplicates removed        │
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│    Articles to read full text   │
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             │      │ Articles excluded based on relevance │
             ├──────│              64                 │
             │      │                                 │
             │      │  No Academic Performance 42     │
             │      │         Other 22                │
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│       Articles to include       │
│              13                 │
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             │      │ Reference list search of titles │
             │      │              35                 │
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             │      │                                 │
             │      │        Duplicate 6              │
             │      │      Not relevant 26            │
             ▼      └─────────────────────────────────┘
┌─────────────────────────────────┐
│   Final articles for inclusion  │
│              16                 │
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2019; Souto et al., 2015). It has previously been used as a resource in journal articles from various countries including Australia and New Zealand (Souto et al., 2015). The MMAT revises the quality of the research practices of the researchers of the study prior to being included in systematic reviews (Hong et al., 2018). All 16 articles were considered acceptable under the MMAT (Hong et al., 2018), with four qualitative studies, seven quantitative randomised control trials, four quantitative non-randomised control trials, and one mixed methods study. See Table 1 for a sample of this analysis.

Table 1.

Excerpt from MMAT analysis.

Quantitative – randomised control trial	**Is randomisation appropriately performed?**	**Are the groups comparable at baseline?**	**Are there complete outcome data?**	**Are the outcome assessors blinded to the intervention provided?**	**Did the participants adhere to the assigned intervention?**
Franco et al., 2011	Yes. A random allocation process was completed, and 30 students became the control group, and 31 the experimental group.	Yes. There was no statistically significant difference between groups pre-test, on any of the measures.	Yes. There was complete outcome data. No missing data was reported.	Yes. All participants were delivered the pre-questionnaires and the control group was notified that the intervention would begin in three months whilst the experimental group began the intervention. This is important due to the self-report nature of some measures.	Yes. All participants adhered to their assigned intervention, including the control group who were given a meditation course after the post-scores were completed.
Quantitative – non-randomised study	**Are the participants representative of the target population?**	**Are measurements appropriate regarding both the outcome and intervention?**	**Are there complete outcome data?**	**Are the cofounders accounted for in the design and analysis?**	**During the study, is the intervention administered as intended?**
Beauchemin et al., 2008	Yes. Four classes of students were recruited to participate.	Yes. The measures are appropriate. The domains are clearly defined and measured using appropriate, validated scales.	Yes. There are a few questions with missing data, however, the dataset can be considered complete due to this being over 80% (Hong et al., 2018).	Yes. It was acknowledged and accounted for that approximately half the students had previous mindfulness experience.	Yes. All processes and procedures were completed as designed.

Excerpt from MMAT analysis.

Qualitative study	Is the qualitative approach appropriate to answer the research question?	Are the qualitative data collection methods adequate to address the research question?	Are the findings adequately derived from the data?	Is the interpretation of results sufficiently substantiated by data?	Is there coherence between qualitative data sources, collection, analysis and interpretation?
Langer et al., 2020	Yes. The study was designed to understand the subjective experiences of adolescents taking part in a mindfulness-based intervention.	Yes. 20 adolescent students aged 12 - 14 years and 11 months were interviewed. A semi-structured interview format was used and was conducted by two psychologists not involved in the implementation of the intervention. These were recorded for transcription.	Yes. Thematic analysis was used to determine themes and subthemes within the data. An external coder was used to act as an auditor to minimise the effects of groupthink.	Yes. Quotes are used to answer the research questions, along with a summarisation of the key themes.	Yes. There is clear evidence of collection and analysis practices, allowing for transparency and cohesion.

The CRAPP test is designed to evaluate the source of information and its suitability for the purpose (Blakeslee, 2004). It has been found to be an effective tool to evaluate credibility (Esparrago-Kalidas, 2021). CRAAP stands for Currency, Relevance, Authority, Accuracy, and Purpose (Blakeslee, 2004). The CRAAP test has been used to verify the suitability of the articles for inclusion. All articles were considered to be reliable. The researcher had previously decided that research from within the last 10 years would be considered current, however, there were two articles which were outside of this timeframe. One was published in 2011 and the other 2008, as these articles are within the last 15 years, due to the lack of research in this field, it was decided that these would still be included. See Table 2 for a sample of the CRAAP test.

Table 2.

Excerpt from CRAAP analysis.

	Currency	Relevance	Authority	Accuracy	Purpose
Hamalainen et al., 2021	The information was published in 2021.	This article relates to my topic as ACT is mindfulness based. It is at an appropriate level as it is an academic article.	The seven authors are researchers at two Finland universities, all researchers work in the faculty of education and psychology. Email communication is available with the first author.	The information comes from a randomised control trial conducted by the authors. The document is peer-reviewed and supported by backing evidence of other studies.	The authors' intention is to educate the reader on the findings of their research. The point of view is impartial and there are no biases used to persuade the reader.

Excerpt from CRAAP analysis.

Franco et al., 2011	The information was published in 2011; 11 years ago. The information coincides with similar research conducted today, so is considered to be current for the topic.	This paper is relevant as it explores the effects of mindfulness interventions on secondary student academic performance as well as mental health.	The four authors are researchers from the University of Almeria, Spain.	The article is published in an academic journal and is peer-reviewed. The research is supported by other information referenced in the article.	The authors' intent is to educate readers on the importance of mindfulness techniques in the education system. The information is based on fact.
Langer et al., 2020	The information was published in 2020 and is therefore current.	This article is a qualitative approach to understanding the effects of mindfulness interventions on adolescents. As a journal article the information is at an appropriate level for the context.	The eight authors of this article are researchers from universities and corporations of relevance, including non-for-profit education support services and psychological rehabilitation services.	The information comes from an intervention in secondary schools, conducted by the researchers, and supported by other evidence.	The purpose is to inform the reader of their findings and the potential benefits to secondary students.

The 16 articles for inclusion then had the findings extracted, and themes identified regarding mindfulness intervention, academic success, and wellbeing in high school students (Cohen et al., 2018 p.551). The thematic analysis was conducted using a semantic approach which allowed for the themes to be identified from the explicitly stated content, without interpreting beyond what has been said (Braun & Clarke, 2006). The statements were taken and coded, as a way to organise the data to show patterns (Braun & Clarke, 2006). After the themes were identified, a latent approach was adopted to understand the underlying issues and concepts which have emerged (Braun & Clarke, 2006). This will take place in the discussion.

Limitations
The collection of primary data to investigate the effects of school-based mindfulness on academic performance was outside of the scope and timeframe of the study, and would not have met ethical approval available to the researcher at the time of the study. This results in the main limitation of this research being the lack of knowledge of practical application in an Australian classroom as part of the ASWF. In addition to this, this study is limited by the inability to infer causation, rather only explore themes which arise in pre-existing international literature. The literature findings are from studies based in Canada, Chile, Finland, Hong Kong, Spain, and the United States of America. There were no Australian studies which met the inclusion criteria.

In consideration of the limitations imposed on the study, a systematic review was selected as the best methodological process to investigate the research question. This form of study allowed for themes to emerge amongst the literature and provide a diverse exploration of mindfulness-based interventions in schools, and the effects on wellbeing, academic performance, and other behavioural or cognitive aspects of the student. The credibility of the literature was considered when the search was being undertaken, therefore, only peer-reviewed journal articles were included, after undergoing the previously stated quality analysis.

The aim of the study was to determine if school-based mindfulness interventions are a way of improving academic performance and wellbeing as a part of the ASWF. This study reveals the strengths and weaknesses of previously conducted interventions in schools. This allows for the current study to deliver a thorough and comprehensive analysis of current school-based mindfulness interventions and guide teachers and schools to implement a wellbeing strategy to improve academic performance.

Chapter 3: Literature Review

The literature search resulted in a total of 16 articles being included in this systematic review. These articles on school-based mindfulness interventions have been summarised, see Appendix 1.
As previously stated, this systematic review comprised of qualitative, quantitative, and mixed method studies. 4,258 secondary school students were participants in the review, from private and public schools, in city, suburban, and rural settings. No students had clinical diagnoses, some had learning disabilities as defined by low academic performance, and others were determined to be at-risk. Mindfulness intervention programs included mindfulness meditation, mindfulness yoga, mindfulness-based stress reduction, mindfulness-based cognitive therapy, mindful martial arts, mindfulness-based acceptance and commitment therapy, mindfulness-based group counselling, and a variety of different mindfulness curriculums. A variety of objectives were present amongst the study, along with measurement instruments, but all studies explored school-based mindfulness interventions and had a measure, or qualitative equivalent, of academic performance.

Emerging Themes
After analysing the articles found in the literature search, trends in the data were identified and used to create themes and subthemes. Table 3 demonstrates the compaction of themes.

Table 3.

Themes and Sub-themes.

Theme	Sub-themes
Academic performance	• Executive functioning • Grade point average and achievement scores • Work completion • Academic engagement
Goal setting and relevance to life	• Goal setting • Relevance to life
Interest in program and engagement	• Reasons for joining • Engagement in intervention
Intervention delivery	• Environment • Frequency and dosage • Perception of instruction • Intervention components • Intervention delivery • Facilitator • Delivery time • Independence within intervention
Emotional and behavioural changes	• Anger management • Social skills and interaction • Confidence and self-esteem • Stress and Anxiety • Sleep

Themes and Sub-themes.

Self-improvement and progress	• Personal growth • Self-concept
Attention, Awareness and Concentration	• Attention and self-awareness • Concentration

Academic Performance. Academic performance emerged as a theme, predictably, with all of the articles mentioning this in some regard. There were mixed results with the effects of school-based mindfulness. Frank et al. (2017) found that, after the required adjustments, there were no statistically significant differences between the intervention and control groups in academic performance, in terms of English and Maths grades. Similarly, Felver et al. (2019) found that there was no statistically significant difference in academic grades between the intervention and control groups. It was also found that there were no significant differences in executive functioning between students who undertook school-based mindfulness intervention or the active control, a relaxation program, but the findings did demonstrate significant improvements from pre-post intervention (Lassander et al., 2020). Another study found that student reported outcomes of academic performance did not differ by study condition or intervention dosage; however, teacher-reported academic performance improved significantly (Mendelson et al., 2015), suggesting that students aren't necessarily aware of the effects of the intervention despite teachers observing their improvements. Frank et al. (2021) also found mixed results in regard to measures of academic performance. Executive functioning as a whole measure was not significant, yet, two out of three components of executive functioning found statistically significant results, demonstrating improvements in selective attention and inhibitory control, post-intervention (Frank et al., 2021). Students who participated in the mindfulness intervention were also found to have significantly faster response times (Frank et al., 2021). Additionally, Lam & Seiden (2020) found significant improvements in executive functioning, including in working memory. Franco et al. (2011) found that a school-based mindfulness intervention significantly improved student academic performance, as measured by overall academic performance and individual subject grades. Academic performance, defined by work completion, persistence with work, listening and focus, involvement in group work, and test anxiety, saw significant improvements in all domains after the mindfulness intervention (Milligan et al., 2017). Likewise, Wisner and Norton (2013) found mindfulness interventions to improve school functioning, including academic performance. Students post-mindfulness intervention displayed significantly increased levels of engagement in learning and cognitive restructuring (Frank et al., 2017). Mindfulness interventions have also improved problem solving skills in academic contexts (Langer et al., 2020). It was determined that a higher dosage of mindfulness was associated with higher academic performance (Hämäläinen et al., 2021; Mendelson et al., 2015). Teachers also reported an increase in student academic comprehension post-intervention and have encouraged the continuation of the mindfulness-based interventions (Milligan et al., 2017). Students and teachers both reported that there was an increase in academic risks being taken and schoolwork being completed after involvement in the intervention (Milligan et al., 2017).

A quote from a student participant shares her personal experiences of improvement after the mindfulness intervention:

> *During tests, I used to think about other things, I didn't concentrate and made stupid mistakes, and now it's like I'm concentrating more, and instead of telling myself not to think about something, I let it flow and start thinking about what I have to do, and I'm doing better* (Langer et al., 2020, p.8)

Findings show that there is a significant effect of mindfulness-based interventions on student academic success (e.g. Beauchemin et al., 2008; Franco et al., 2011; Frank et al., 2021; Gonzalez-Valero et al., 2019; Lam & Seiden, 2020; Langer et al., 2015; Lopez-Gonzalez et al., 2018).

Goal setting and relevance to life. This theme emerged within a quarter of the literature in this review, and it was considered rather poignant. The students who participated in mindfulness-based interventions with a clear purpose tended to be more committed participants (Lam et al., 2015; Langer et al., 2020). "*Only those who really wanted to achieve something with this stayed in the program*" (Langer et al., 2020, p.8). Students who joined with a purpose and believed it would help them solve personal issues, such as improving their concentration, relieving stress, and emotions, had a greater involvement in the program (Lam et al., 2015). For example, one participant joined the mindfulness program to help them with their sleep:

> *Initially, I joined the program, because I often found it hard to concentrate when I was trying to do something. Or before going to bed, I had a lot on my mind. I couldn't fall asleep, until I felt overwhelmed by tiredness at around 3/4 o'clock in the morning. Yet sometimes, I could barely rest even when I was sleepy. Just before I went to bed, I would suddenly feel quite stressed. I did not know what exactly it was, but something—it was crushing, crushing my heart. Anyway, I just could not sleep. So, I wanted to join the program, to see if it could help me relax* (male, grade 10; Lam et al., 2015).

Milligan et al. (2017) had its participants partake in an intake interview where in addition to sharing information about the program with the participants, they required them to determine personal goals for the program. This was designed to support students to generalise the skills they were learning and implement strategies to assist them in achieving their goals (Milligan et al., 2017). In line with the finding of the other studies, high retention rates during the mindfulness-based intervention were experienced with only 2 out of 36 students dropping out due to lack of interest (Milligan et al., 2017). Langer et al. (2015) found that overall, mindfulness meditation programs are well-received by adolescents and have low drop-out rates, suggesting that a universal intervention with pre-determined objectives including prevention of problems and early detection, and the promotion of health and wellbeing, can have greater impact than a targeted program for those at-risk, as its benefits are not only for treatment or recovery.

The goal setting aspect is involved in the transition of making the skills involved in the mindfulness interventions relevant to life outside of the sessions. Langer et al. (2020) stated that central to the mindfulness intervention delivered in their study was the applicability of the mindfulness tools to the daily life of the individual. Lam et al. (2015) found that a large percentage of the students involved in their intervention did not join with a personal interest, goal, or need and these students had unsatisfactory participation. If the students felt bored and didn't see the attraction, or point, of the program, they did not wish to continue (Lam et al., 2015). It has been suggested that it would be advantageous to draw student attention to the potential benefits of mindfulness activities, to attract and maintain adolescent interest and motivation (Lam et al., 2015). Langer et al. (2020) found that, amongst others, informal practices such as tooth brushing, mindful eating, and dish-washing help to cultivate mindful awareness in daily life. The program allowed students to feel that they were in a conducive learning environment, benefiting their psychological wellbeing and life (Langer et al., 2020). One student shared her willingness to join the intervention program based on the relevance it had to her life, "*I think studying is really stressful. I heard the teacher say that the program could teach us how to reduce pressure, so I decided to join*" (Lam et al., 2015, p.377). In the study by Langer et al. (2020), the importance of placing learning outcomes in contexts which are natural and demonstrate the advantages of implementing mindfulness strategies in daily life and their potential academic, stress, social, and sporting benefits, was highlighted. A participant described the benefits of the intervention as "*... a life experience, because everything was useful...*" (Langer et al., 2020, p.8).

Interest in program and engagement. Student involvement in research is required to be informed and voluntary; however in one study, disregarding researchers' instructions, some teachers strongly encouraged or coerced students into participation when they weren't interested or

didn't know what it was (Lam et al., 2015). In this study, only a small percentage of participants joined because of personal goals and interests; other reasons students joined the study included to avoid other activities or subjects, and peers or friends enrolling (Lam et al., 2015). The impact this has on the retention of participants in the program is profound. In the schools where student interest was discussed, and all students participated voluntarily, a drop-out rate of six percent (Milligan et al., 2017), twelve percent (Langer et al., 2020), and thirteen percent (Lam et al., 2015) was observed due to a lack of interest, but in one school with lower levels of personal interest, 65% of students dropped out of the intervention (Lam et al., 2015). A lack of interest in the mindfulness activities was made obvious by some students considering the tasks to be boring, passive, dull, and strange and weird (Lam et al., 2015). This dissatisfaction was not consistent amongst studies, with other studies finding positive attitudes towards mindfulness interventions and peer recommendations occurring to their friends (Langer et al., 2020: Milligan et al., 2017). One student shared how she enjoyed the mindfulness-intervention and recommended it to her friend, lending them her uniform, and *"they're excited about it"* (Milligan et al., 2017, p.339). Lam et al. (2015) found that a failure to capture student interest resulted in high drop-out rates, low attendance, poor behaviour, and a failure to complete at home practices of mindfulness as designed in the intervention. Findings from Lam et al. (2015) also demonstrated greater academic performance in the smaller group size, with full voluntary participation and better engagement. This has been echoed by Hämäläinen et al. (2021) who found that a higher interest and investment in the mindfulness intervention, had greater improvements in academic performance. It is suggested that for a school-based mindfulness intervention to be successful, the most important step is to first create interest and motivation amongst students (Lam et al., 2015).

Intervention delivery. This theme incorporates multiple aspects of the delivery of a school-based mindfulness intervention, which were mentioned across multiple articles. These components of intervention delivery include the environment, the frequency and dosage of the intervention, the perception of instruction, intervention components, intervention delivery, facilitator, delivery time, and independence within intervention.

Environment. In one study by Lopez-Gonzalez et al. (2018), a significant effect was found of classroom climate on the relationship between mindfulness and academic performance. Lam et al. (2015) found an effect of the class size on students' participation and engagement, and low engagement was found to be reflected in behavioural problems during mindfulness sessions. These behaviours included talking, sleeping, and playing games with other members of the class, and either distracting their peers or influencing them to imitate their behaviours (Lam et al., 2015). At one of the schools, in the study by Lam et al. (2015), an instructor acknowledged the difficulty of building rapport with all the students and motivating them as the group was too large. Lam & Seiden (2020) also saw large class sizes for the intervention. It has been found that large class size hinders the intervention (Lam et al., 2015). The instructor also stated that the location of the intervention served as an additional barrier, due to its small size not allowing students to appropriately participate in activities, such as stretch their arms and legs, or complete the mindful walking exercise (Lam et al., 2015). The environment in this school improved after some students dropped out, creating more space per student, and allowing for better conditions to learn (Lam et al., 2015). The remaining students became more interested, cooperative, and motivated (Lam et al., 2015). In a second school in the study by Lam et al. (2015), the class size was smaller and had adequate space for a yoga mat, this instructor found behaviour to be better and it easier to build rapport in the smaller group. Lam et al. (2015) also explored the impact of a more conducive environment on students. They found a place with ample space and good facilities enhanced student interest in the intervention (Lam et al., 2015). A student suggested that the second environment was better because *"... the equipment there was better. Those lights could be dimmed gradually. They didn't have to be turned off..."* (Lam et al., 2015, p.380). The learning environment greatly

influenced student satisfaction and perception of the intervention, and academic success (Lam et al., 2015; Langer et al., 2020; Lopez-Gonzalez et al., 2018).

Frequency and dosage. Mendelson et al. (2015) found significant results indicating that higher levels of program dosage was associated with greater improvement, compared to low dosage, on teacher-reported academic performance. Intervention sessions ranged from 30 minutes (Frank et al., 2017; Wisner & Norton, 2013) to an hour and a half (Franco et al., 2011; Milligan et al., 2017), with the most common intervention session being 45 minutes (Beauchemin et al., 2008; Langer et al., 2020; Lassander et al., 2020; Mendelson et al., 2015). Intervention frequency ranged from once per month for five months (Lam & Seiden, 2020), to two to four sessions per week for 8 weeks (Wisner & Norton, 2013). Langer et al. (2015) stated that 10-12 sessions, less than an hour, is preferable.

Another component of the intervention was at-home practice, in which students were provided the tools to conduct mindful practice outside of school (Hämäläinen et al., 2021; Lam et al., 2015; Lam & Seiden, 2020; Lassander et al., 2020). Participants were not practising formal mindfulness on a regular basis as suggested (Hämäläinen et al., 2021; Lam et al., 2015; Langer et al., 2020), yet, did report implementing mindfulness techniques in their daily life (Langer et al., 2020). It is understood that students who practise mindfulness outside of the scheduled intervention sessions would benefit more from the mindfulness intervention as a whole (Lam et al., 2015).

Perception of instruction. The interaction and interpersonal relationship between the facilitator and the students is important (Lam et al., 2015). Participants stressed the importance of the facilitator's attitude towards establishing a positive relationship with the group, through patience, acceptance, and kindness (Langer et al., 2020). Some of the negative feedback regarding the facilitators involved behaviour management, *"she failed to control the classroom order"* (Lam et al., 2015, p.378) which affected the moral of the group, and "*the way the instructor spoke* [being] *very dull"* (Lam et al., 2015, p.378). In contrast, most students had positive things to say about their instructor. The benefits of patience was emphasised by one participant, *"the instructor is good. What we don't understand, she will teach us again"* (Lam et al., 2015, p.378). Other students found the way the instruction was delivered to be *"very effective, very good, very simple"* (Langer et al., 2020, p.7), and students commented *"what she taught was quite right. I learnt a lot, and I found it very suitable for me"* (Lam et al., 2015, p.378). Kindness was also emphasised by the students, *"it was good, he* [was] *really friendly"* (Langer et al., 2020, p.8) and *"he was kind… he was calm"* (Langer et al., 2020, p.8). *"With him, it was easy to say things"* (Langer et al., 2020, p.8) *"and talking with him* [was] *not like a debate, it is speaking freely and nothing we say is wrong"* (Langer et al., 2020, p.8).

The instructor's expertise and experience leading the mindfulness intervention was highlighted as a positive by participants, along with the relevance of their own mindfulness practice which is necessary due to the cultivation of mindful teacher presence being pivotal to offering students concrete examples of what is being taught during the intervention (Langer et al., 2020). *"The instructor is very good… she was very good at doing this mindfulness program as she could control her emotions very well. She did not lose her temper or scold us"* (Lam et al., 2015, p.378). In addition, facilitator self-disclosure in this way generates trust and reciprocity in the relationship with participants, who are able to connect to the facilitator's humanity, rather than seeing them as an authority figure (Langer et al., 2020).

Intervention components. Students who participated in a school-based mindfulness intervention undertook one or more of the following intervention components. Mindfulness-based activities included yoga, breathing techniques, meditation, body and emotional awareness, mantras, mindful movement, journal writing, mindfulness martial arts, cognitive behavioural strategies, relaxation mindfulness, mindful eating, and mindfulness based stress reduction (Beauchemin et al., 2008; Felver et al., 2019; Franco et al., 2011; Frank et al., 2021; Frank et al., 2017; Gonzalez-

Valero et al., 2019; Hämäläinen et al., 2021; Lam et al., 2015; Lam & Seiden, 2020; Langer et al., 2015; Langer et al., 2020; Lassander et al., 2020; Lopez-Gonzalez et al., 2018; Mendelson et al., 2015; Milligan et al., 2017; Wisner & Norton, 2013). The interventions differed greatly amongst the literature; studies used mindfulness-based interventions, or excerpts from the programs, such a TLS (Frank et al., 2017), L2B (Frank et al., 2021; Lam & Seiden, 2020), ABCs (Action-Breathing-Centring; Frank et al., 2017), .b curriculum (Langer et al, 2020), MBSR (Mindfulness-based stress reduction; Lam & Seiden, 2020), Mindfulness-based cognitive therapy (Lam & Seiden, 2020), Dialectical behaviour therapy (Lam & Seiden, 2020), Integra MMA (Milligan et al., 2017), and RAP club (Mendelson et al., 2015). TLS is a mindfulness-based curriculum which is high in reliability, it has a session script to ensure consistent implementation (Frank et al., 2017). TLS utilises ABCs in the form of yoga postures, breathing techniques, and meditation, with a purpose of reducing stress, and promoting physical and social-emotional health (Frank et al., 2017). Similar to TLS, L2B follows a program structure designed to increase the effectiveness of the program (Frank et al., 2017; Frank et al., 2021; Lam & Seiden, 2020). L2B is a program which focuses on 6 areas corresponding to the acronym BREATHE: Body, Reflection, Emotions, Attention, Tenderness, Habit, and finally Empowerment, the main program goal (Frank et al., 2021; Lam & Seiden, 2020). The .b curriculum contains exercises and elements, which contribute to skill development, common to many mindfulness-based interventions, and is adapted for an adolescent population (Langer et al., 2020). It is based on a MBSR approach, and utilises formal and informal mindfulness practices, a 10-munite formal mindfulness practice, such as body scan, mindful movement, or sitting meditation, was completed initially to train participants' awareness of bodily sensations, emotions, and thoughts, followed by an informal practice, such as mindful toothbrushing, mindful eating, and mindful dishwashing, which aims to support the cultivation of present-moment awareness in daily life (Langer et al., 2020). The RAP club program combined psychoeducation and cognitive behavioural strategies with mindfulness, designed to promote self-regulatory abilities and decision-making (Mendelson et al., 2015). The Integra MMA intervention was the most physically active out of the interventions, requiring students to observe and accept bodily sensations whilst making fast and dynamic movements (Milligan et al., 2017). Other programs, such as Lam et al. (2015), determined their own program using mindfulness exercises. Lam et al. (2015) took their participants on a full-day mindfulness retreat, at a university, half-way through the intervention, allowing students a different environment to practice the exercises they had learnt in the regular sessions. Participants were guided through mindfulness sessions with instructions on posture and meditation, followed by a question-and-answer time (Wisner & Norton, 2013). The L2B program was delivered with a brief introduction and group participation activities and discussion to engage students, followed by the in-class mindfulness practice, and students had weekly practice tasks and journal writing requirements to promote a personal practice (Frank et al., 2021). Participants were also provided with workbooks and audio files to complete the at-home exercises (Frank et al., 2021). Similarly, .b curriculum provided students with a notebook containing at home exercises and provided participants with audio of mindfulness exercises to support this independent practice (Langer et al., 2020). An audio recording including a body scan, stretching exercise, breathing exercise, loving-kindness practice, and listening to the bell practice was also provided to participants in Lam et al. (2015). Despite the differences in interventions, the key elements in most of the interventions were the same; Lassander et al. (2020) also combined psychoeducational aspects surrounding stress and sleep with mindful relaxation, and group discussion, assignments, and at-home tasks, with audio available to participants.

Intervention delivery. The interventions were delivered with a variety of different strategies. Many interventions commenced with simpler activities and built upon them, such as learning to observe the breath without altering respiration before mindfulness meditations (Franco et al., 2011; Lam et al., 2015; Lam & Seiden, 2020; Wisner & Norton, 2013). Langer et al. (2020) utilised slides and film segments to support engagement and the comprehension of the content, such as attention and difficult emotions, which *"were fun… because they weren't literal"* (p.7). Whilst

some students reported some of the mindfulness intervention activities to be too passive and slow, such as the mindfulness eating and meditation (Lam et al., 2015), other students really enjoyed these activities, asking for more of them, especially the mindful eating (Langer et al, 2020). Student comments on the passive nature of the intervention demonstrate this contrast, *"Lying on the floor and feeling my own body … This experience was very novel to me"* (Lam et al., 2015, p.379), where novelty is attractive to the adolescents, and *"I think the program did not suit me, like those activities that involve lying down… it was too static, and it was always the same. Every lesson was the same. There were different topics, but they were still similar"* (Lam et al., 2015, p.379) Activities which integrate mindfulness into movement, such as yoga, tai chi, and martial arts, appear to be more attractive to students (Lam et al., 2015; Milligan et al., 2017).

The participants appreciated the use of imagery in explanations of intangible concepts (Langer et al., 2020; Wisner & Norton, 2013). One example of this is the use of "monkey mind", where the mind is compared to a monkey going from tree to tree, a metaphor for a thought entering awareness and shortly after replaced by another, at times it can feel like thinking has a mind of its own; students were reassured that this is a natural part of mindfulness meditation (Wisner & Norton, 2013). The metaphorical contents were positively evaluated, *"the example of a torch … helped a lot for everyone to understand how [attention] worked"* (Langer et al., 2020, p.7).

Facilitator. The primary facilitator or instructor of the intervention varied between studies. Some studies utilised the researchers as the facilitator (Felver et al., 2019; Wisner & Norton, 2013), whilst some used trained practitioners (Frank et al., 2017; Lam et al., 2015; Mendelson et al., 2015), and others trained the teachers (Beauchemin et al., 2008). In the case of Wisner & Norton (2013) teachers were used to provide feedback about each student before and after the intervention. This is similar to Milligan et al. (2017), where teachers were asked to participate in interviews to provide feedback about students post intervention. Lam et al. (2015) utilised trained mindfulness professionals, much like Frank et al. (2017) who's facilitators were trained at delivering the TLS program they used in their study. Milligan et al. (2017) had facilitators who were trained in mixed martial arts, ashtanga yoga, and advanced therapeutic mindfulness training. The trained practitioners used in Mendelson et al.'s (2015) study were mental health professionals, assisted by young adult members of the community. Lam et al. (2015), similarly, had a teacher and university student provide logistical support. Langer et al. (2020) utilised independent psychologists with research interviewing experience to gain insight into the program to decrease bias and increase the honesty in participant's responses. Contrasting the other studies, Langer et al. (2020) had teachers participate in the mindfulness intervention alongside the students. Beauchemin et al. (2008) and Frank et al. (2021) were the only studies to train teachers to deliver the program, Beauchemin et al. (2008) stated this was a time costly procedure.

Delivery time. Most of the mindfulness interventions were delivered during class time. Students participating in Milligan et al.'s (2017) study were excused from regular coursework once per week in the lesson before lunch. Other studies, such as Mendelson et al. (2015) and Lam & Seiden (2020), administered the intervention during classes which were not part of the main curriculum, such as music or art. Langer et al. (2020) delivered the intervention during class time within the students' usual classroom. Lam et al. (2015) differed from the other studies in that it was undertaken after school, as part of the school's extracurricular activities. This contributed to the low attendance, due to a common clash with other extracurricular activities (Lam et al., 2015).

Independence within intervention. A quarter of the studies included in this review spoke explicitly about the independence of the students within the program. Lam et al. (2015) shared the challenge of "if students refuse to start trying to practise, there is no chance" (p.382) of them developing their mindfulness skills, and thus emphasised the importance of it being an independent decision to participate, to result in the students being self-motivated. Wisner & Norton (2013) used independence in the form of student voice; their first task for participants was to develop group

norms for them to follow. Students were also given the freedom to decide *how* they undertook the mindfulness sessions, with choices of sitting in a chair, sitting cross-legged on a yoga mat, or kneeling (Wisner & Norton, 2013). Similarly, Beauchemin et al. (2008) allowed student to decide whether they closed their eyes or kept them open. Students were encouraged to share their experiences and discuss concerns which may arise; this was facilitated with question-and-answer time at the end of the session (Wisner & Norton, 2013). Instructors tried to utilise student interest or background in the sessions to stimulate conversations (Frank et al., 2017), and ask students to reflect on the mindfulness practice in relation to their daily lives (Lam et al., 2015). Students had the opportunity to individualise the sessions by opening discussions about topics or experiences that they were having, and gain feedback, such as one student shared drowsiness as a barrier to her mindfulness practice, in which the facilitator responded and then peers were asked to share coping strategies or their own challenges (Wisner & Norton, 2013). Students provided feedback about the mindfulness interventions stating they would like more options and freedom (Langer et al., 2020).

Emotional and behavioural changes. There were many emotional and behavioural changes associated with the mindfulness interventions. Students reported feelings of increased relaxation, *"one feels more relaxed, lighter"* (Langer et al., 2020, p.9) and the effect of this on their mental state *"everything was relaxing, and my mind was no longer entangled"* (Langer et al., 2020, p.9). Students also reported feeling *"happier with myself, I feel more grateful with what I have"* (Langer et al., 2020, p.9). General emotional regulation was also touched upon within Mendelson et al. (2015), Milligan et al (2017), and Wisner & Norton (2013), which all found the mindfulness intervention to increase students' ability to be aware of themselves, their feelings, and emotional outcomes, improving their ability to respond thoughtfully. *"You get a deeper understanding of what you really are thinking about and how to control your feelings"* (Milligan et al., 2017, p.341). General behavioural responses also improved across multiple studies. Beauchemin et al. (2008) found mindfulness interventions significantly reduced teacher reported, problematic student behaviour, post intervention, and Wisner & Norton (2013) found improvements in behavioural functioning. This was echoed in Milligan et al. (2017) where teachers reported improvements in behaviour, such as:

> One of [my student's] biggest problems is containing that energy and not just saying what he thinks and doing what he wants. And he is just like a, he's like a mini volcano, just constantly erupting, usually verbally. Now... he's very verbal and still has outbursts, there's no doubt about it, but someone has shown him at least one way, that in a positive way, how he can release that energy and not disrupt the class. Anyone who has probably seen him from first semester to second semester would see a change (p.340).

Students reported being able to identify when they were utilising avoidant behaviours, such as fight, flight, or freeze, and that this new awareness supported them to modify their behaviours (Milligan et al., 2017). Students had increased attendance with significantly fewer unexplained absences, fewer detentions, and improved engagement in class (Frank et al., 2017), and increased acceptance of authority (Mendelson et al., 2015). Contrarily, Felver et al. (2019) found no changes to problematic behaviour or school attendance.

Students also experienced an increase in resilience. One student reported that they still feel *"sad, but not defeated"* (Milligan et al., 2017, p.341). Students developed protective attributes during their mindfulness intervention, experiencing significantly less deterioration in rumination and stress during high pressure times, compared to the control (Felver et al., 2019; Lam & Seiden, 2020). Students felt that they had more tools at their disposal during difficulties, and those experiencing more stress implemented their mindfulness practice independently more frequently. Students were able to *"let go of the certain problems that were just dragging"* (Milligan et al., 2017, p.341) them down.

Anger management. The intent of mindfulness interventions is to emphasise paying attention to different parts of the body with non-critical awareness of what arises from moment to moment, which is known to lead to improvements of problematic behaviours and response inhibition (Gonzalez-Valero et al., 2019; Lassander et al., 2020). Students self-reported improvements in anger management skills after the mindfulness intervention, one student noted that the skills learnt are beneficial because whilst *"the anger definitely doesn't go away… it helps me better manage it"* (Milligan et al., 2017, p.341). Students were able to take the skills they learnt about fight, flight, and freeze responses, and pair them with behaviour, such that *"if you're in your fight, you're being aggressive. If you're in flight, you run away. If you freeze, you're just stuck there. That, kind of, make me more aware of what I'm doing in an argument or what I'm doing in just normal life"* (Milligan et al., 2017, p.341), and *"you can calm yourself down before doing something you will kind of regret"* (Milligan et al., 2017, p.341). Similarly, another student commented, *"I liked those meditations. After a meditation session, my anger seemed to have disappeared because I had been concentrating on my own breathing. Unknowingly, I would stop thinking nonsense"* (Lam et al., 2015, p.381). After having completed three projects, a student's mother broke the computer and a student lost all his work due that night, the situation *"was pretty stressful and I was pretty angry at my mother, and MMA helped me deal with that, I had a mindful moment and a mindful self-talk. I ended up getting all the stuff done"* (Milligan et al., 2017, p.340). Students also noted the improvements of their anger management having flow-on effects in other aspects of their lives, *"my family isn't afraid to be around me anymore. Because I had major problems where I would like actually hurt someone and now I don't do that anymore"* (Milligan et al., 2017, p.340). In Langer et al. (2020), one student shared her own experience of improved anger management, *"I tend to get very angry and argue, so when I'm arguing I calm down, breathe, close my eyes, and that has helped me with others"* (p.9). Another student echoed this sentiment, *"well me and my grandma fight… or me and my mum. When they're fighting or yelling at me… now I don't react in a bad way or something, to get myself in more trouble, I… calm down and go to my room and just think … before I say [anything]"* (Milligan et al., 2017, p.340). The ability for students to implement the skills they have learnt in the mindfulness intervention into their daily lives is crucial to their ability to manage their anger, *"I was just so frustrated. I wasn't thinking straight, so when I did the meditation that night it helped me like calm down and realise what I was actually doing"* (Milligan et al., 2017, p.341). Teachers also echoed the students' sentiments, witnessing improvements in self-awareness around their behaviours and implementing anger management strategies independently (Milligan et al., 2017).

Social skills and interaction. Students demonstrated a significant improvement in social skills from pre- to post-intervention (Beauchemin et al., 2008), as well as in interpersonal strengths and family involvement (Franco et al., 2011; Wisner and Norton, 2013). Wisner & Norton's (2013) findings also reaffirmed existing literature that school-based interventions aid psychosocial functioning. Overall, students demonstrated improvements in social competence (Milligan et al., 2017). A teacher shares an observation of a student, *"he'll actually* [have a] *conversation… with teachers and stuff that he's had for the semester, he's very respectful and that, so just yeah, way more confident"* (Milligan et al., 2017, p.340). Shy or withdrawn students demonstrated an increase in approaching social interactions compared to prior to the intervention (Milligan et al., 2017). A teacher shares a student's improvements with involvement in class:

> He talked to me but wouldn't really talk with his peers… as the [mindfulness intervention] went on he had a more open posture towards the class as opposed to just sort of here and listening but not really turning and engaging. So there was more engagement. And, he worked well when I put him in lab groups. He still wasn't really strong about initiating. I think I saw once where he asked somebody if he could work with him. But, he was more open posture-wise, to everything. When I said, okay, can you find a partner, he would turn. Whereas, before he would just kind of sit there and wait and know that I eventually would make something work for him (Milligan et al., 2017, p.339).

Students who were more social also had benefits to their social skills, with increased empathy and social perspective, such as this student reflection, *"Some people label others… I wasn't really aware of that. [Now] I am a lot more aware of what people are calling each other"* (Milligan et al., 2017, p.340). It was reported by teachers that students displayed an increase in adaptive and appropriate conversation with teachers and peers (Milligan et al., 2017). One student identified that he had become *"more out there"* (Milligan et al., 2017, p.339) since commencing the intervention, and other students reported the social benefits of making friends in the intervention extended beyond the group setting and into the broader school context (Milligan et al., 2017). One student reiterated this by saying, *"for once I actually felt like I fit and I was actually a human being instead of an outcast"* (Milligan et al., 2017, p.339). Students developed social skills through open communication and empathy, for example when one student raised their dislike of the silence of the mindfulness meditation, others validated this by sharing their same concern and discussed the potential reasons for this (Wisner & Norton, 2013).

On a different note, mindfulness-based interventions enable participants to improve problem-solving skills in a relational context, such as with peers and friends, as they developed new strategies to cope with challenges in their daily life (Langer et al., 2020). This is demonstrated by a student, *"last year there was a fight in the change room nobody knew about and I just stood there and watched, and I probably shouldn't have … This year… I feel like I would know what to do, I would know to stop the fight and not just let it continue"* (Milligan et al., 2017, p.340). The mindfulness intervention helped students develop a willingness to stand up for others, and helped them approach social interactions and mange impulses in stressful interactions with peers, teachers, and family (Milligan et al., 2017). It is likely that the mindfulness intervention supports students to regulate their emotions, which contributes to their enhanced family involvement (Wisner & Norton, 2013). Mindfulness interventions, including meditation and relaxation training, is a feasible way to promote social functioning in adolescent students (Beauchemin et al., 2008).

Confidence and self-esteem. Students and teachers both noticed improvements in participants' confidence across the intervention (Milligan et al., 2017). One teacher reported, *"I could see him gaining confidence as he went through the program"* (Milligan et al., 2017, p.341) and these developments in confidence resulted in *"huge improvements"* (Milligan et al., 2017, p.341) with social interactions and self-regulation. The improvements post- intervention were felt by the students, *"I now have more confidence in myself to be able to do things"* (Langer et al., 2020, p.9) *"it gives me a sense of security, the security that I can do it"* (Langer et al., 2020, p.9). Effects were also observed at the emotional level, having the greatest effect on students' sense of calm and wellbeing (Langer et al., 2020). This improvement in wellbeing and self-esteem is explained by a student, *"[it] makes me actually like myself more than what I have, because I used to hate myself and was so depressed all the time"* (Milligan et al., 2017, p.340). Another student noted, *"every time I find myself talking negatively about myself and whatnot, I tend to just think of one of* [the mindfulness techniques and] *self-talk that will help me stop"* (Milligan et al., 2017, p.340). Self-esteem is a crucial element to wellbeing and the mindfulness interventions supported students to maintain or build a good self-esteem, *"people's comments used to affect me a lot, and now I don't care, that has helped me a lot"* (Langer et al., 2020, p.9), *"I used to have really low self-esteem, 'cause I've been bullied since grade 1… so naturally my self-esteem went down a lot. It's changed extremely"* (Milligan et al., 2017, p.340).

In addition to this, the mindfulness interventions caused important changes to participant self-concept, in total self-concept and its dimensions (academic, emotional, familial, and social; Franco et al., 2011). It was noted by a student that *"you get to learn about yourself"* (Milligan et al., 2017, p.341). These improvements in self-confidence were observed alongside emotional regulation of negative emotions such as anxiety (Milligan et al., 2017).

Stress and Anxiety. Levels of both state and trait anxiety have been found to decrease after school-based mindfulness interventions (Beauchemin et al., 2008; Franco et al., 2011; Milligan et

al., 2017). Frank et al. (2017) found that the mindfulness intervention had a significant effect on primary coping, secondary coping, cognitive restructuring, and emotion regulation, whilst Lam & Seiden (2020) found significant effects on rumination. All of which can demonstrate improvements in managing experiences of stress or anxiety (APA, 2022). Surprisingly, Felver et al. (2019) did not find a significant difference in psychosocial resilience from pre-post intervention; however, in the intervention-control comparison the control group had significantly lower levels of resilience, indicating that the mindfulness intervention served as a buffer to resilience in the face of great stress (exam time; Felver et al., 2019):

> *"There was a final summative [assessment] for civics and I didn't think I was going to get it done, so I was stressed about that. Then I kind of used everything from* [mindfulness intervention] *and just kind of went I will do my best. I will try to get it done. If I get it done – great, if not, I'll ask if I can have an extra day. I finished it!"* (Milligan et al., 2017, p.339).

In regard to state anxiety, one student commented on the improvements he's experienced in a social setting, *"well before I could barely stand to be around two people without having a panic attack because of my anxiety. But, now at least I can stand with my group of friends, which is about five"* (Milligan et al., 2017, p.339). Students also mentioned that the mindfulness intervention supported them to calm down when stressed (Milligan et al., 2017). Mindfulness interventions can be an effective way to reduce anxiety in adolescent students (Franco et al., 2011).

     Sleep. *"To me, attending the program was to help me to sleep"* (Lam et al., 2015, p.379). For some students gaining better sleep quality was the aim of participation in the mindfulness intervention, *"I just could not sleep. So, I wanted to join the program, to see if it could help me relax"* (Lam et al., 2015, p.377). Students experienced positive effects of the mindfulness interventions on their sleep; in the areas of onset latency, quality, effectiveness, and objective and subjective sleep (Frank et al., 2017; Langer et al., 2015). Some participants reported an improvement in sleep quality, and it took them less time to fall asleep than before, *"I started integrating* [mindfulness practice]*, and now I fall asleep almost immediately"* (Langer et al., 2020, p.9). Students reported these positive sleep effects associated with quality and relaxation, *"it allowed me to feel sleepy, and my idea was to make my mind go blank, so to speak, to help me sleep, because it's like I'm always thinking, and I can't fall asleep"* (Langer et al., 2020, p.9). Contrastingly, Frank et al. (2021) found no significant difference on sleep pre-post intervention or on intervention versus control.

Mindfulness interventions have the potential to target thinking, behaviours, and emotions in a way that's not easily reachable in talk therapy with adolescents (Wisner & Norton, 2013). Participants reported a greater sense of wellbeing, calm, and, most of all, a sense of personal growth created through improved happiness, gratitude, and self-confidence (Langer et al., 2020).

     Self-improvement and progress. School-based mindfulness interventions provide a valuable opportunity for growth and self-improvement, and *"from* [a student's] *point of view, the programme is well done because it goes through stages… its like you are steadily learning the techniques in order to improve"* (Langer et al., 2020, p.7). Participants shared their experiences of the mindfulness intervention and how students felt that the program allowed them to *"mature more and grow in many ways"* (Langer et al., 2020, p.9) and experienced an increase in mindfulness capacity. *"At the start, in the first session, I couldn't actually do any of the things I was asked to do, I couldn't control myself, but by the last session I was really relaxed and I did everything well"* (Langer et al., 2020, p.8). Franco et al. (2011) found a statistically significant increase in all domains of participants self-concept. Improvements were observed in Spanish and South American adolescents in academic, emotional, social, and familial self-concept after the mindfulness intervention, with the most significant effect being on students' emotional and academic self-concept (Langer et al., 2015). This emotional and academic self-concept provides students with an

increased ability to accept challenging academic situations and move forward, this can be explained from this student's perspective, *"I failed a test recently so I just did like a mindful moment and I thought about it, and I came to acceptance with the fact that I failed, and I can do better – I can try next time"* (Milligan et al., 2017, p.341).

      Attention, Awareness and Concentration. Mindfulness strategies encourage the development of present-focussed awareness through experiential practices like observing their breath (Mendelson et al., 2015). It is essential when practicing mindfulness, the focus is not the thoughts themselves, rather the awareness of the thoughts without evaluating, judging, or analysing them, watching how they appear and disappear, and allowing them to go by (Franco et al., 2011). Mindfulness interventions focus on teaching students to increase their awareness of their thoughts and feelings, and to practice acceptance and let go of negative thoughts and experiences (Milligan et al., 2017). Students were encouraged to cultivate self-awareness and to support one another, teach each other, and, where appropriate, challenge one another (Wisner & Norton, 2013). Students shared positive feedback of the mindfulness exercises on their development of concentration and self-awareness, *"activities like lying on the floor, concentrating on my body, on what my body is doing, were one of the main factors which helped me"* (Langer et al., 2020, p.7), *"when I read I think of something else, and then I have to read it all over again, but I count my breaths and my heartbeats and all those things… and I concentrate more"* (Langer et al., 2020, p.9).

      Frank et al. (2021) found that changes in executive functioning post intervention suggest that mindfulness may benefit students through decreased cognitive interference and improved selective attention. The use of mindfulness-based interventions in the classroom has been reported by both students and teachers to be particularly helpful in improving attention, focus, and concentration (Milligan et al., 2017). It affects memory load, with intervention participants experiencing increased levels of attention to changes in stimuli (Frank et al., 2021). Students who participated in the mindfulness-based intervention displayed a higher level of selective attention (Frank et al., 2021). This could be due to the mindfulness creating an increase in focus on tasks and decrease in attention to distractors, lessening cognitive load and improving performance on tasks (Frank et al., 2021). A student shared their experience of this change in selective attention and how this allowed them to *"sort* [their] *ideas from the most important to the least important, that's what needs to be resolved now"* (Langer et al., 2020, pp.8-9). Mindfulness strategies employed in the intervention, such as breath and body sensation awareness, body scan, and sitting and walking meditations, allow students to develop skills in remaining present in the moment and allowing thoughts to flow freely, which can improve the management of challenges and problems and avoid engaging in automatic responses of avoidance or aggression (Franco et al., 2011; Milligan et al., 2017). Remaining present isn't always about managing problems though. One student shared her experiences of remaining present in the moment, *"I learned to realise things I had never realised before. For example, when I was walking, I didn't notice the places that I had passed, nor did I give myself the time to see well"* (Langer et al., 2020, p.8).The largely top-down process of cognition and emotion which occurs through the mindful attention of one's own body, reveals regulatory strategies that were learned and implemented by students, establishing new ways of managing difficult situations (Langer et al., 2020). This is demonstrated by a student's experience after their mindfulness intervention:

> When I was doing my math exam and stuff like that, a few spots I was kind of like iffy and then I would just stop and relax and do one of those mindful- moment things that we were taught. It just helped my mind like kind of clear of all the cluttered stuff—like I was trying to think of everything at once (Milligan et al., 2017, p.341).

When dealing with experiences that may cause distress, post intervention, participants narrate the impact of mindfulness on their ability to move from a state of aversion to acceptance (Langer et al., 2020), *"[it]reminded me that a lot of the time, what I think isn't always what's true and just to always not set limits for yourself in your head before you actually try"* (Milligan et al., 2017,

p.339). The benefits of mindfulness on attention and concentration have been felt by students in class, with students *"more aware of the things* [they] *do"* (Langer et al., 2020, p.8) and paying *"more attention to the lessons than before"* (Langer et al., 2020, p.8). One student commented that *"I have been more aware of things they teach me… before I got distracted a lot"* (Langer et al., 2020, p.8).

After their mindfulness-based intervention, students reported improvements in self-awareness, attention, sense of calmness, and acceptance, as well as managing academic and social challenges, anxiety, and anger, and experiencing greater self-confidence, after the mindfulness intervention (Milligan et al., 2017). Participants experienced significant improvements in emotional awareness and clarity, impulse control, social connectedness, mind wandering, perceived stress, and self-compassion, as well as substance use, relative to the control group (Frank et al., 2021).

> *"We should continue learning how to work on [mindfulness skills] more, and also the activities we did were fun"* (Student; Langer et al., 2020, p.7).

Chapter 4: Discussion

This systematic review contains a synthesis of 16 journal articles on the effects of school-based mindfulness interventions aimed to determine the suitability of a school-based mindfulness intervention to improve wellbeing and academic performance as part of the ASWF. These articles underwent thematic analysis and themes emerged regarding the implementation and effect of the interventions. The findings from this systematic review are discussed below with the relevance to implementation into the classroom.

Academic performance

The majority of findings from this study demonstrated a significant effect of school-based mindfulness interventions on secondary student academic performance, in line with previous research (Creswell, 2017). There are some contrasting results, which have many potential reasons for the discrepancies. Lassander et al. (2020) used an active control and executive functioning as a measure of academic performance. This could suggest that the mindfulness exercises have a similar impact on the executive functioning component of academic success as relaxation; there is research which demonstrates a relationship between relaxation exercises and increased executive functioning (Cordeiro et al., 2021). In this mindfulness versus active relaxation control study, students completing the mindfulness intervention had significantly better grades than those in the relaxation program (Cordeiro et al., 2021), indicating that executive functioning may not be a holistic measure of academic performance. Whilst Felver et al. (2019) did not have significant improvements in academic performance, results from their study showed significantly less decline, than the control group, in resilience in the face of stress. The TLS program used by Frank et al. (2017) is scripted meaning that there is no genuine interaction between the facilitator and participants during the mindfulness exercises. As we know from the findings, the interpersonal relationship and interaction between the facilitator and participants is crucial to the success of the intervention, thus it could be suggested due to the lack of genuine interaction there was no significant effect. With these considerations in mind, and the overall results of the research, this study found that school-based mindfulness interventions can improve academic performance in secondary school students. These findings align with those from Šouláková et al. (2019) who found school-based interventions to have significant outcomes on academic achievement in primary and secondary school students.

Goal setting and relevance to life

Goal setting appears to be an important element for the success of a mindfulness intervention. Findings revealed that students who had goals and could see the benefits of the mindfulness intervention for daily life had greater interest and engagement. This finding provides practical information which can be used to maximise the benefits for students who are partaking in a school-based mindfulness program.

Interest in program and engagement

The personal interest of the students is very important, it has been found to have great effects on the retention of students in the mindfulness intervention and on their engagement. There were mixed findings on students' satisfaction with the programs; however, coercion by teachers or not understanding the program relevance seemed to be the main issues effecting student interest in and satisfaction of the intervention. Studies showed positive student attitudes towards the intervention, with recommendations to peers. The findings show that where participants have higher levels of interest and engagement in the intervention, had less problematic behaviour and also had greater improvements in academic performance. This theme identified the importance of creating interest for students and explaining the effects this may have on the efficiency of a mindfulness intervention. This provides practical implications for introducing mindfulness interventions to students in class and the need to build student interest.

Intervention delivery

The format of the intervention delivery appeared to be a very important component contributing to the benefits of the mindfulness intervention. Findings show that the environment of the intervention greatly influenced student satisfaction and perception of the intervention. Students appreciated a spacious environment, conducive to the activities, with good facilities, even small things like dimmable lights were acknowledged by students to make a difference. This aligns with previous research acknowledging the impact of the environment on the effectiveness of mindfulness practice (Seabrook et al., 2020). Greater benefits from the mindfulness intervention were found in smaller group size, with full voluntary participation and better engagement, suggesting that interest and engagement may have an effect on the effectiveness of mindfulness interventions on academic performance (Lam et al., 2015).

The frequency of the intervention became another topic for discussion, with programs varying in length and duration. 10-12 sessions were recommended, which lasted less than an hour (Langer et al., 2015), this aligns with most programs which were 45 minutes in length. Additional supplementary sessions and at home practice allow students to increase their skills in mindfulness and maximise benefits from the intervention. This is consistent with the literature which indicates informal mindfulness practice, and frequency, rather than duration, of formal mindfulness-based practice was associated greater effectiveness (Birtwell et al., 2019).

The importance of the perception of the facilitator was stressed in the findings. Students perceived the facilitator to affect the moral of the group, and the facilitators kindness, patience, and acceptance were also important to students feeling comfortable. This is consistent with literature demonstrating the value of the facilitator to university students, including their expertise and the authenticity brought to the practice (Bamber & Schneider, 2020). Similarly, the findings from this study found the facilitator's expertise and own mindfulness practice were perceived to be beneficial, and their self-disclosure built trust and created reciprocity rather than hierarchy. There were positives to both external facilitators and teacher facilitators. Formally trained, external facilitators brought expertise, and authenticity, to the practice which students appreciated, whilst teacher facilitators brought familiarity and pre-established rapport.

There are a large variety of interventions activities or components used; however, all the studies used formal mindfulness activities using breathing techniques, and body awareness exercises. This

inconsistent with the literature (Gueldner & Feuerborn, 2015; Huppert & Johnson, 2010). Mindful movement, such as yoga, mindful walking, and mindful martial arts, was also popular amongst the findings, with students engaging well in these activities. Students positively viewed metaphors and imagery being used to support them to comprehend intangible concepts.

This study found it most effective for the mindfulness intervention to take place as part of the regular school day, during class time. This demonstrates to students that the school or teacher value the mindfulness-intervention, which may increase students' ability to perceive benefits. Independence was also an important component for the success of the mindfulness interventions, as students who were given this freedom and choice had greater levels of engagement and self-motivation. No previous literature regarding freedom, choice, or independence in mindfulness practice on program effectiveness or engagement could be obtained.

The findings from this theme provide practical implications for the design, structure, and delivery of school-based mindfulness interventions, allowing for previous literature and experience to guide the construction of a mindfulness intervention, to maximise the potential benefits for students.

Emotional and behavioural changes

There were many emotional and behavioural changes experienced by students after their mindfulness intervention. Students reported feeling happier, more grateful, more resilient, and having a clearer mind. Improvements in emotional regulation and problematic behaviours were also found, along with improvements to attendance and engagement and reductions in unexplained absences and detentions. These improvements are in line with pre-existing literature, which demonstrates positive behavioural changes as a result of mindfulness (Dekeyser et al., 2008; Donald et al., 2019).

Skills in anger management were a benefit acquired by many students during their mindfulness intervention. Some students reported this being linked to an increased awareness of their own emotions and emotional responses, whilst others associated this with mindfulness leading to them having a clearer mind. Teachers also echoed the sentiment of improvement. These improvements in anger management included students who were considered at-risk and those with prior low academic achievement. It was initially considered that the type of mindfulness may have played a role in the development of anger management skills, as mindful martial arts was the program with a lot of evidence regarding this. However, as one of the main purposes of Milligan et al.'s (2017) study, it could be expected that students will have spoken about their anger. Emergence of this theme amongst other studies where mindfulness meditation, breathing and body awareness, and mindful movement were used, demonstrated a broader generalisability of this finding to school-based mindfulness interventions as opposed to the martial arts themselves. These findings are consistent with previous research which demonstrated higher levels of mindfulness were related to lower levels of anger, aggression, rumination, and hostility (Borders et al., 2010; McKeering & Hwang, 2019). The reduction of anger and hostility in students would create more positive learning and teaching environments, and allow for less behaviour management to occur during class time, thus maximising teaching and learning time.

Students' social skills and interactions were found to have improved post intervention. Students were reported to be more open to social interaction and have increased empathy and perspective, as well as displayed more adaptive behaviours and had more appropriate conversations with teachers and peers. This is likely due to developments in emotional awareness, communication skills, and prosocial behaviours. The emergence of the sub-theme of confidence and self-esteem was closely related to improvements in wellbeing. These improvements in self-esteem and self-confidence saw students believe in themselves more and have greater sense of security, calmness, and wellbeing. These findings are unsurprising and echo the existing literature (e.g., Canby et al., 2015; Šouláková et al. 2019). This increased self-esteem and wellbeing also saw increased resilience in response to bullying behaviours and reduced negative self-talk, as reported by students. Students also noted learning a lot about themselves and improvements in self-concept were found.

Unsurprisingly, decreased levels of stress and anxiety were found post- mindfulness intervention, including decreased levels of stress, state anxiety, trait anxiety, and improvements in primary and secondary coping, and cognitive restructuring; important for managing experiences of stress and anxiety. This aligns with the majority of the literature stating a negative relationship between mindfulness and distress, stress, and anxiety (e.g., Canby et al., 2015; Chen et al., Ma & Fang, 2019; Masuda & Tully, 2012). This reduction in anxiety will also improve student wellbeing through a decrease in challenges (Dodge et al., 2015).

Contrasting results were found in regard to improvements in sleep, after the mindfulness intervention. Multiple students joined their mindfulness intervention with a goal or desire to improve their sleep, some reported improvements in sleep quality and time taken to fall asleep, whilst students in Frank et al.'s (2021) study found no significant change in sleep at all. This variability is not inconsistent with the literature, which has found that mindfulness shows promise for improving sleep, but it is yet to be understood which mechanisms of mindfulness-based interventions actually support sleep (Shallcross et al., 2019). If the mindfulness intervention does have an additional bonus of improving sleep, this will assist with improving student academic performance, as there is a link between sleep in adolescence and academic performance (Mak et al., 2012).

These findings for positive emotional and behavioural changes align with the previous literature; mindfulness is associated with reduced stress, anxiety, depression, rumination/worry, distress and increase in health, wellbeing, and life satisfaction, improvements in emotional regulation, attention, prosocial behaviours, and impulse control, as well as increased calmness, compliance, and relaxation and decreased tiredness and aggression (Bostic et al., 2015; Cairncross & Miller, 2020; Chen et al, 2018; Dekeyser et al., 2008; Donald et al., 2019; Ma & Fang, 2019; Masuda & Tully, 2012; Micklitz et al., 2021; Schussler et al., 2020; Slonim et al., 2015; Tang et al., 2015). This provides evidence to support the use of school-based mindfulness interventions to foster students' emotional and behavioural development. The development of these skills improves students' wellbeing and enhances learning (Education council, 2020).

Self-improvement and progress

This theme is closely related to emotional and behavioural changes, however, has one main difference; self-improvement and progress involves developing their mindset and the awareness of this development taking time. Student participants in the mindfulness interventions experienced growth, acknowledging that practise was required to improve and learn new skills. Students also experienced improvements in academic, emotional, social, and familial self-concept, demonstrating a development in their personal view of themselves and who they are in these domains. The understanding that they were not defined by a single moment and that they were capable of more was also recognised by students, post-intervention. These skills could be beneficial for student resilience and commitment to their education, through self-belief and understanding that they, and we all, are a work in progress.

Attention, Awareness and Concentration

Students reported an increased attention and concentration in class and the ability to adjust their mindset through self-awareness. The mindfulness intervention allowed students to develop important skills in awareness of thoughts and the ability to implement mindfulness exercises to clear the mind and refocus on their task at hand. Previous research demonstrates that mindfulness can benefit wellbeing through the development of skills in attention and awareness, leading to enhanced emotional regulation, that serves multiple health and wellbeing outcomes (Lomas et al., 2017). This study, similarly, found that students were able to pay greater attention to their surroundings, increasing acceptance, and decreasing responses of avoidance and aggression; increasing overall psychological resources (Dodge et al., 2015). Students were found to display

higher levels of selective attention post-intervention, likely due to the mindfulness intervention increasing the ability to focus on tasks and decreasing attention to distractors, lessening their cognitive load, and leading to improvements in academic performance.

Overall results and the implementation

Students had overall positive reviews of mindfulness interventions and shared their desire for ongoing mindfulness practice. The themes and findings of this study found that student participants benefited from a school-based mindfulness intervention. Students were found to have experienced improvements in academic performance after the school-based mindfulness intervention. Students experienced increases in happiness, gratitude, relaxation, and prosocial behaviour, developed anger management skills, resilience, social skills, empathy, confidence, self-esteem, and self-concept, which all contributed to students having increased psychological and social resources available to them and decreased psychological and social challenges through reduced stress and anxiety; leading to improved student wellbeing (Dodge et al., 2012).

Limitations

This study is restricted by the reliance on published articles, limiting the research to secondary data. There are limited published research studies on school-based mindfulness interventions for secondary school students. No Australian studies met the inclusion criteria. The cultural and ethnic backgrounds of participants amongst the included studies varied greatly and many weren't from 'western' first-world countries. Whilst this is a limitation, Australian classrooms are becoming more multicultural and ethnically diverse, this global perspective on mindfulness interventions could serve as a benefit to implementation in a diverse class of students.

Limitations in the studies reviewed in this systematic review include: sample size (Felver et al., 2019; Gonzalez-Valero et al., 2019; Lassander et al., 2020; Mendelson et al., 2015; Wisner & Norton, 2013), lack of control group (Beauchemin et al., 2008; Langer et al., 2015; Wisner & Norton, 2013), active control group (or desire for; Felver et al., 2019; Langer et al., 2015; Lassander et al., 2020), specificity of study (Lopez-Gonzalez et al., 2018), cross-sectional design (Langer et al., 2020), subjective and self-report measures (Frank et al., 2017; Frank et al., 2021; Lam & Seiden, 2020; Wisner & Norton, 2013), interviews were voluntary (only those who were motivated participated; Langer et al., 2020; Milligan et al., 2017), limitations to randomisation (Lam & Seiden, 2020; Langer et al., 2015; Mendelson et al., 2015; Milligan et al., 2017), no long term follow-up (Beauchemin et al., 2008; Felver et al., 2019; Frank et al., 2021; Mendelson et al., 2015), challenges measuring usage/practice and engagement (Felver et al., 2019; Frank et al., 2021; Hämäläinen et al., 2021, Milligan et al., 2017), potential diffusion of treatment (Lam & Seiden, 2020), and lack of control over variables (Lopez-Gonzalez et al., 2018). Thus, resulting in a number of limitations to the findings of this study, including the generalisability of the results.

The search strategy used in this systematic review was designed to reduce bias and increase reliability and validity but did limit the article inclusion criteria. Thus, whilst an extensive literature search was conducted, articles included in this study cannot be claimed to be an exhaustive list due to the exclusion of papers written in languages other than English or published in formats other than peer-reviewed journal articles (such as books or unpublished theses).

Again, this study is limited by the lack of Australian research into school-based mindfulness interventions in secondary schools. The recommendations for further research will be noted in Chapter 5.

Chapter 5: Recommendations and conclusion

The findings from this study provide implications for teachers and schools, by providing a practical application of the ASWF, through a mindfulness intervention, to benefit not only student wellbeing, but behaviour and academic performance. The study presents a new perspective for mindfulness interventions in schools and presents implications for future research. The following recommendations are made:

Recommendations for schools
As beneficial as school-based mindfulness interventions appear to be, there is not enough Australian evidence to consider it reasonable or practical to make the changes that would be required to implement school-wide mindfulness interventions. It is recommended that schools trial a mindfulness intervention with an individual year level or class.

It is recommended that a mindfulness intervention be delivered over the space of one term, during class time, such as pastural care. The availability of additional non-required practices, potentially in home-class in the morning or during recess, or at home practices would allow for students to have choice in the frequency of their practice, and for the benefits to be maximised.

From the findings of this study, it is believed that facilitation of the program is key to the success of the intervention. Students reported the desirability of the facilitator to have their own mindfulness practice and expertise. In addition to this, the teachers' expertise support the pedagogical-relational requirements for students to develop mindfulness skills, and research has demonstrated that when values education is combined with 'best practice' pedagogy and quality teaching, there are positive benefits for student wellbeing and academic performance (Clement, 2010). Thus, it is recommended, before attempting to implement mindfulness into the classroom, that teachers undertake mindfulness-based intervention professional development and adopt their own mindfulness practice.

The mindfulness intervention should provide students opportunities for both formal and informal mindfulness practices, as this allows students to develop their mindfulness skills in a way which can be adapted to their daily life and be used as a self-management tool; supporting them emotionally, behaviourally, and academically.

Before commencing the mindfulness intervention, students need to be communicated with to explain the purpose of the program, what it involves, the potential benefits, and that mindfulness skills take practise to develop. This allows for students to comprehend what the intervention will look like, and hopefully peak their interest. It is then recommended that students take some time to determine their own goals for the intervention.

From the findings of this study, it is recommended that a mindfulness intervention include mindful movement activities or sessions, to increase engagement with a variety of students. If multiple classes are undertaking the mindfulness meditation, then it is recommended that after a few initial sessions to learn the basics of mindfulness and experience a variety of mindful activities, that students be given the independence to select and choose a particular mindfulness program of interest, such as yoga, mindfulness meditation, or mindful martial arts, which could be run in separate spaces. This provides students the option to engage in the program in a way which motivates them, and they can develop their goals around their chosen intervention type. Regardless of the intervention type, it is key that students undertake mindfulness exercises which teach them breathing techniques and to become aware of their thoughts without judgement and then let them go. It is also recommended that more basic mindfulness skills are taught before building to

more advanced ones, allowing for students to progress and develop their skills. To provide students with a good comprehension of concepts, utilising metaphors and imagery is recommended, such as that of the "monkey mind".

In line with the findings, it is recommended that students be given space and opportunity to share their concerns and experiences with peers, in a conversation facilitated by the teacher, in a respectful and non-judgemental environment.

Another component to consider when implementing a mindfulness intervention is the environment where the program is taking place. It should be considered whether there is enough room for students to complete the mindfulness activities without needing to by hypervigilant about where other people are, and thus drawing their attention away from the mindfulness intervention itself. As such, mindfulness meditation would require less room than yoga or mindful martial arts. It was also touched upon that dimmable lighting was preferred by students as it allowed for gradual adjustment rather than lights on to lights off. It is therefore recommended that thought be given to the environment in which the intervention takes place; whether the classroom is appropriate or perhaps a gym or drama room would be more conducive. It is also recommended that students undertake the mindfulness intervention in a quiet environment, away from excessive noise.

Recommendations for future research
As it has been previously stated, there is limited research into school-based mindfulness interventions on secondary student wellbeing and academic performance. It is recommended that future research be conducted in this area, particularly in Australian schools. Primary research into the impacts of school-based mindfulness interventions on Australian secondary student wellbeing and academic performance is needed. Previous research suggests that the mindfulness interventions are beneficial for all students, not just neurotypical students, indicating that a school-based intervention may be generalised to a classroom population, and have positive outcomes for all students. Future research may also explore the impacts of a school-based mindfulness intervention delivered in a typical classroom, investigating the effects and potential benefits for students of diverse backgrounds, at-risk students, and neurotypical students alongside those who aren't neurotypical, such as those with autism, ADHD, or anxiety. These research topics could provide great implications for the implementation of mindfulness in the Australian classroom and provide much needed additional literature.

Conclusion
The findings from this study are particularly relevant and important at present, during uncertainty of the Covid-19 pandemic. The increasing levels of psychological distress in Australian youth and the emergence of the Australian Student Wellbeing Framework, means an evidence-based and effective intervention is needed to provide support to students with their mental health and wellbeing (Brennan et al., 2021; Education Council, 2020). Supporting students in innovative ways is vital to the health and wellbeing of students (Egan et al., 2021). With mindfulness being recognised to address all four of the top concerns identified by Australian youth, *mental health*, *coping with stress*, *body image*, and *school or study problems,* there is great potential to support more than just student academics (Bergen-Cico et al., 2013; Chen et al, 2018 p. 1656; Franco et al., 2011 p.15; Ma & Fang, 2019; Masuda & Tully, 2012 p.67). In addition, the findings of the study indicated that a school-based mindfulness intervention would also align with the Australian Curriculum's Personal and Social Capability, supporting students to develop their skills in self-awareness, self-management, social awareness, and social management (ACARA, 2022).

The findings from this study indicate that an effective means of improving wellbeing and academic performance amongst secondary students would be to implement a school-based mindfulness intervention which incorporates the opportunities for independence and goal setting, with activities explored in a way relevant and useful to daily life. More research is needed to determine if school-based mindfulness interventions would be beneficial to student wellbeing and academic outcomes, in Australian secondary school students.

Despite the limitations present in this systematic review, a synthesis of information on the effects of school-based mindfulness interventions on academic performance has been delivered. The findings demonstrate the potential for mindfulness-based interventions to be an effective tool for improving the wellbeing, academic performance, and problematic behaviours of secondary school students, as part of the ASWF.

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Appendix 1.

Table of articles for inclusion.

Study	Design	Participants	Intervention	Objectives	Measurement
Beauchemin et al., 2008	Non-randomised control trial, quantitative	34 students aged 13-18 years (M_{age}=16.39) Learning disabilities defined by compromised academic performance	Mindfulness meditation	To examine the feasibility of, attitudes towards, and outcomes of a 5-week mindfulness meditation intervention	SSRS – Social Skills Rating System – teacher report STAI – State-Trait Anxiety Inventory – self-report Attitudinal questionnaire – self-report
Felver et al., 2019	Randomised control trial, quantitative	27 students in year 9-12 (M_{age}=16.39) Ethnically diverse high school with high proportion of at risk students USA	L2B curriculum (A mindfulness training and universal prevention program)	Students in the intervention will demonstrate improvements in psychosocial resilience, reduction in problematic behaviour and increase attendance and overall academic grades.	Psychosocial resilience (SEARS-SF) – self-report Psychosocial problem behaviour (BASC-3) – self-report Student attendance – objective Academic grades – objective
Franco et al., 2011	Randomised control trial, quantitative	61 students aged 16 - 18 years (M_{age}=16.75) Spain	Meditación Fluir (A mindfulness program)	To analyse the effects of the mindfulness program on academic performance, student self-concept, and anxiety.	Academic grades – objective Self-Concept Questionnaire – self-report State-trait Anxiety Inventory – self-report
Frank et al., 2017	Randomised control trial, quantitative	159 students in year 6 (53.3%) and year 9 No ages given. USA	TLS – Transformative Life Skills (A mindfulness yoga-based, social-emotional wellness promotion program)	To assess the effectiveness of the TLS program on adolescent emotional distress, prosocial behaviour, and school functioning	School engagement scale – self-report Student academic and behavioural records – objective Attitudes Toward Violence Scale – self-report PANAS-C – Positive and Negative Affect Schedule for Children – self-report RSQ – Responses to Stress – self-report CBCL – Child Behaviour Check-List – self-report Children's Intervention Rating Scale – self-report

Table of articles for inclusion.

Study	Design	Participants	Intervention	Objectives	Measurement
Frank et al., 2021	Randomised control trial, quantitative	251 high-school students USA	L2B curriculum (A mindfulness training and universal prevention program)	To assess the effects of manualised mindfulness-based program for adolescents, on wellbeing, mental health, substance use, and executive functioning.	CAMM – Child and Adolescent Mindfulness Measure – self-report SCS-SF – Self-Compassion Scale-Short Form – self-report DERS – Difficulties in Emotion Regulation Scale – self-report PHQ-8 – Patient Health Questionnaire – self-report GAD-7 – Generalised Anxiety Disorder scale – self-report RRQ – Rumination and Reflection Questionnaire – self-report ASQ – Adolescent Stress Questionnaire – self-report CSI – Children's Somatisation Inventory – self-report ASWS – Adolescent Sleep-Wake Scale – self-report SCC-R – Social Connectedness Scale-revised – self-report MWQ – Mind Wandering Questionnaire – self-report IT – Implicit Theories of Intelligence Scale for Children – self-report Substance Initiation Index – self-report YAAPST – Young Adult Alcohol Problems Screening Test – self-report Stroop Test (attention) – objective BART – Balloon Analogue Risk Task

Table of articles for inclusion.

Study	Design	Participants	Intervention	Objectives	Measurement
					(risk taking) – objective
					EFN-back – Emotional Faces N-back Task (working mem, attn, and emotion reg.) – objective
					Engagement/ participation – self-report
Gonzalez-Valero et al., 2019	Mixed methods, systematic review, and meta-analysis	Secondary Education component – papers x5 615 students 12-20 years in secondary education ($\approx M_{age}$=14.63 (approximate calculation, non-statistical)) Participants from various locations Study completed Spain	MBSR EES MFY Strong minds – mindfulness MBCT	To review the scientific literature in order to analyse the effect produced by cognitive-behavioural and mindfulness strategies on stress, anxiety, and depression in students.	DASS-21 DSM-IV PSS
Hamalainen et al., 2021	Non-randomised controlled trial, quantitative	157 year 9 students (M_{age}=15.26) Finland	Web-based Mindfulness based Acceptance and Commitment Therapy	Examine the usage activity, perceived usefulness, and program satisfaction of a web-based mindfulness program.	Usage activity – objective Satisfaction questions – self-report Perceived usefulness – self-report EATQ-R – Early Adolescent Temperament questionnaire – self-report Academic achievement – objective GHQ – General Health Questionnaire (stress domain) – self-report DEPS – Depression scale – self-report SWLS – Satisfaction with Life Scale – self-report
Lam et al., 2015	Qualitative	51 students in year 9-10 Less academically able students	Researcher designed, mindfulness intervention	To determine if a mindfulness-based program in mainstream secondary schools could help improve the	Questionnaire – self-report

Table of articles for inclusion.

Study	Design	Participants	Intervention	Objectives	Measurement
		(based on primary school grades) Hong Kong		students' emotional competencies and academic performance.	Semi-structured interviews – subjective Attendance rate – objective Drop-out rate – objective
Lam & Seiden, 2020	Randomised control trial, quantitative	115 students (M$_{age}$=12.4) Hong Kong	L2B curriculum (A mindfulness training and universal prevention program)	Determine whether a mindfulness curriculum was an effective social and emotional learning program	YSR – Youth self-report – self-report BRIEF-SR – Behaviour Rating Inventory of Executive Function-Self Report – self-report Perceived stress – self-report DERS – Difficulties in Emotion Regulation Scale – self-report RRS – Rumination Responses Scale – self-report General Questionnaire – self-report
Langer et al., 2015	Systematic review, qualitative	16 papers, 2116 secondary school students (≈M$_{age}$=15.58 (approximate calculation, non-statistical)) Participants from various locations Study completed Chile	Mindfulness techniques Adaptation of MBSR (Mindfulness-Based Stress Reduction) Mindfulness for Schools Program L2B (Learning to Breathe) program MBSR and MBCT program for Adolescents Mindfulness for the Awareness of Breathing Mindfulness program with technical meditation flow and ACT Flow meditation Meditation for mindfulness of breathing	Study the effects of mindfulness meditation interventions administered to adolescents within their educational institution	ACMI ACTI AFA AP ASRES AURE AX BV-TPC CAMS-R CES-D DASS DASS-21 DERS ERS FMI HR MAAS NSI PA PANAS

Table of articles for inclusion.

Study	Design	Participants	Intervention	Objectives	Measurement
			Mindfulness meditation MBCT and CBT		PCS PS PSQI PSS RRS RSS SCAS SICBC SPWB SSRS STAI TESU TIPI TMMS-24 WEMWBS
Langer et al., 2020	Qualitative	20 students, aged 12-14 years, completed interview Chile	.b (pronounced dot B) curriculum (A program developed as part of the Mindfulness in Schools Project, UK)	Analyse the subjective experience of a group of adolescent students following the completion of a mindfulness intervention	Semi-structured interviews – subjective
Lassander et al., 2020	Randomised controlled trial, quantitative	131 students in years 6 and 8 (M_{age}=12 & 15) Finland	HLM program – Healthy Learning Mind program	Examine the effects of a mindfulness intervention vs active control (relaxation program) on executive functioning	Backward digit span subtest from WISC-IV – objective NEPSY-II – Developmental Neuropsychological Assessment – objective Trail Making test from D-KEFS – Delis-Kaplan Executive Function System – objective Switching fluency from D-KEFS – objective Demographic questionnaire – self-report
Lopez-Gonzalez et al., 2018	Non-randomised controlled trial, quantitative	420 students in compulsory secondary education and high school (M_{age}=14.29)	REMIND (A relaxation mindfulness program)	Determine if there are differences by gender and academic level in relaxation and mindfulness competence	ETHERMA – Skills and Relaxation-Mindfulness States Inventory for Adolescents – self-report

Table of articles for inclusion.

Study	Design	Participants	Intervention	Objectives	Measurement
		Spain		To analyse the relationship between mindfulness, classroom climate and academics	EBCC – Brief Classroom Climate Scale – self-report Student end-of-course grades – objective
Mendelson et al., 20017	Randomised controlled trial, quantitative	49 students in years 7-8 USA	RAP club (An evidence based program utilising mindfulness and cognitive-behavioural strategies)	Explore whether the program was associated with positive outcomes for students with varying baseline depression, and to evaluate its potential as a classroom wide intervention	SMFQ – Short Mood and Feelings Questionnaire – self-report Self-report measures not-specified (student and teacher)
Milligan et al., 2017	Qualitative	24 students aged 14-17 years (M_{age}=14.87) completed interview 10 Teachers At-risk students attending a rural high school Canada	Integra MMA (A mindfulness-based Martial Arts program)	Explore the impact of Integra MMA on academic, social, and emotional outcomes on high-school students at-risk of emotion regulation challenges.	Semi-structured interview including the CANS - The Child and Adolescent Needs and Strengths, Intake Version – subjective (teacher and student)
Wisner & Norton, 2013	Non-randomised controlled trial, quantitative	28 students in years 10-12, aged 15-19 years (M_{age}=17.28) Students attending a small (n=36) 'alternative education', rural high school USA	Mindfulness meditation in a group counselling format	Explore the benefits of school-based group counselling utilising mindfulness meditation to help students improve functioning.	BERS-2 – Behavioural and Emotional Rating Scale-2/teacher rating scale – self-report/ subjective