Developing Student Mental Toughness:
The Potential Impact of Autonomy Support from Teachers

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Abstract

Developing Student Mental Toughness: The Potential Impact of Autonomy Support from Teachers

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Background: Mental toughness (MT) is a personality trait which supports an individual to overcome obstacles and perform in challenging situations. As a construct, MT shares similarities with resilience and psychological hardiness. In an educational context, benefits associated with high perceptions of MT include increased engagement, better attainments, improved attendance and fewer incidences of disruptive behaviour.

Aim: The study investigated the impact of increased autonomy support (AS) from teachers, through participation in an Autonomy-Supportive Intervention Programme (ASIP), on teachers' and students' perceptions of AS along with students' perceptions of their MT.

Method: There were two parts to the study. Part one related to the participation of teachers ($n = 15$), assigned to either an intervention or waitlist control group, in an ASIP focused on how to support students' autonomy, in line with self-determination theory. The ASIP was delivered over ten weeks using a workshop format. Employing self-report measures and classroom observations, teachers' use of autonomy-supportive instructional behaviours in their practice was recorded. In measuring perceptions of AS pre- and post-intervention, teachers completed an adapted version of the Learning Climate Questionnaire (LCQ) teacher scale. Qualitative data related to teachers' experiences of the ASIP was also collected and analysed as a feasibility study. Part two related to students' perceptions of AS and MT. Pre- and post-intervention, students ($n = 301$) completed an adapted version of the LCQ student scale to assess their perceived level of AS in school while their perceptions of MT were measured using the MTQPlus.

Results: A Wilcoxon Signed-Rank Test and ANCOVAs were conducted on the data collected from the teachers and students. Results showed that there was no significant increase in perceptions of AS for teachers in the intervention group. When accounting for gender and school type, statistically significant interaction effects for students' perceptions of AS were evident. There were no significant changes in students' perceptions of MT.

Conclusions: Results indicated a deceleration of decline in perceptions of AS in female students and students attending school in a rural setting following teachers' participation in the ASIP when compared to the control group. Results did not support the use of the intervention in developing student MT. Implications for teachers, psychologists and allied professionals are considered.

Keywords: Autonomy, autonomy-supportive intervention programme (ASIP), mental toughness, mental toughness development, self-determination theory.

Declaration

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Title of Thesis: Developing Student Mental Toughness: The Potential Impact of Autonomy Support from Teachers.

Declaration: I declare that this thesis is the result of my own original research and does not contain the work of any other individual. All sources consulted have been identified and acknowledged appropriately.

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Acknowledgements

Dedication

Dedicated to the loved ones no longer with us and who are dearly missed.

Your inspiration and guidance have helped me to reach this point in life.

"God has you in his arms, I will always have you in my heart"

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List of Abbreviations

ANCOVA	Analysis of Covariance
AS	Autonomy Support
ASIP	Autonomy-Supportive Intervention Programme
BoM	Board of Management
CPD	Continuing Professional Development
CSO	Central Statistics Office
CYP	Child and Young Person
DES	Department of Education and Skills
EP	Educational Psychologist
ITE	Initial Teacher Education
LCQ	Learning Climate Questionnaire
MIC	Mary Immaculate College
MIREC	Mary Immaculate Research Ethics Committee
MT	Mental Toughness
MTQPlus	Mental Toughness Questionnaire Plus
NCCA	National Council for Curriculum and Assessment
NCSE	National Council for Special Education
NEPS	National Educational Psychological Service
NQT	Newly Qualified Teacher
PSI	Psychological Society of Ireland
RCT	Randomised Control Trial
SDT	Self-Determination Theory
WoE	Weight of Evidence

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Chapter One: Introduction to the Thesis

This introductory chapter outlines key features which structure the thesis. Firstly, a rationale is presented which frames the research in a national context. Secondly, the aims and objectives of the research are proposed. Thirdly, the central constructs of Mental Toughness (MT) and Autonomy Support (AS) are introduced. Fourthly, the epistemological and theoretical considerations underpinning the research are discussed. Finally, the structure of the entire thesis is outlined.

1.1. Thesis Rationale

As an educational and child psychologist in training across school and community settings, I have encountered a desire from many professionals to support the wellbeing of all members of society. This has been especially evident with regards to society's youth where an emphasis is often placed on their social, emotional and psychological wellbeing. Key to this focus is the increased prevalence of mental health issues affecting young people including anxiety (Brown, 2015), depression (Meehan, 2019) and conduct disorders (Wasserman et al., 2018). In the Irish context, this promotion of wellbeing is reflected in recent changes to curriculum provision within the education system (Burke & Minton, 2019).

In 2017, the Junior Cycle Wellbeing Programme at the post-primary level of education was launched and provides a new area of learning where students have an opportunity to enhance their psychological, emotional and social wellbeing (NCCA, 2020). The overarching aim of this programme is for students to enhance key life skills and feel better connected to their communities where subsequent positive effects for educational outcomes and success in life are predicted (NCCA, 2020). It is recognised that this initiative is a starting point for further changes, where the Irish Government aim for wellbeing to be central to the ethos of every school and education institute by the year 2023 (DES, 2020).

In recognising the value of these endeavours, the challenges associated with the promotion of wellbeing are equally apparent. Arising from direct experience on professional placements and informed by further reading, two main challenges would appear to exist for parents, teachers, allied health professionals and those involved in

community services with regards the promotion of wellbeing in youth populations. The first of these challenges is the need for knowledge to be compiled and shared on psychological constructs that best capture aspects of a young person's wellbeing (Mansoory et al., 2019; Raval, Montañez, Meyer, & Berger-Jenkins, 2019). Those which relate to their capacity and abilities to not only survive and cope as they encounter difficulty, challenge and hardship but to also thrive and prosper would appear to have significant merit (Masten, 2014).

A second evident challenge relates to the use and application of methods of intervention (Bourke & Geldens, 2007). While an interest exists from invested stakeholders in supporting a young person's wellbeing, they can, at times, be unsure as to how best to intervene (Raval et al., 2019). In the past, an emphasis has been placed on reactive ways of dealing with issues that negatively impact on wellbeing (Brown, 2015). It was often the case that intervention and support were provided when issues affecting a young person emerged and could be seen to have adverse impacts (Zalewska, Krzywosz-Rynkiewicz, Clough, & Dagnall, 2019). However, practices are changing. A greater emphasis is now placed on the use of interventions and approaches that protect and promote mental health and wellbeing with the aim of reducing the prevalence of more significant issues (Raval et al., 2019). It is hoped that this thesis can assist in addressing both these challenges outlined.

1.2. Aims and Objectives of the Research

In line with models of best practice outlined by the World Health Organisation (WHO) in their upstream and downstream approach to mental health promotion (Auerbach et al., 2016; Kypridemos, 2017), this thesis will investigate the effectiveness of a self-determination theory (SDT) informed intervention delivered to teachers. This intervention, referred to as an autonomy-supportive intervention programme (ASIP), focuses on how to support a young person's autonomy in a school context. This has been shown to be a proactive way of satisfying the basic psychological needs of a young person and in turn can have benefits for their wellbeing (Alivernini, Cavicchiolo, Manganelli, Chirico, & Lucidi, 2018; Gutiérrez, Sancho, Galiana, & Tomás, 2018). As discussed, the promotion of student wellbeing is one of the most significant current developments within the Irish education system at all levels, where particular emphasis

is placed on the development and application of preventative ways of intervention to support students (NCCA, 2020).

Acknowledging the significant role of teachers in the lives of young people and the widely used practice in Ireland of intervening at the level of the teacher when aiming to create positive effects for students, it is hoped that this thesis can further highlight their potential in promoting student wellbeing during interactions (Burke, 2019; Núñez, Fernández, León, & Grijalvo, 2015). Consequently, the research project is a small-scale study which aims to explore the potential impact of the ASIP, delivered to teachers, on students' perceptions of their Mental Toughness (MT) and Autonomy Support (AS), and on teachers' perceptions of AS. As will be explored in the next section of this introductory chapter, by using autonomy-supportive behaviours that foster an autonomy-supportive learning environment, teachers can influence the degree to which students' basic psychological needs are satisfied which may in turn impact on their MT (Mahoney et al., 2014).

In this regard, while constructs like resilience are used within the educational domain when discussing wellbeing, it is a further aim of this thesis to explore MT as a construct that may provide new insights (Lin, Mutz, Clough, & Papageorgiou, 2017). Reflecting on the Irish educational context, several features exist which may support the feasibility of such an intervention and study design. At the primary level of education especially, core values of the curriculum which guide teacher practice include 'students learning how to learn' and 'encouraging a love of learning amongst students' (DES, 1999). These are principles intended to influence how teachers engage students and highlight a teacher's responsibility to nurture the autonomy of the students in their care. Accounting for new developments in Irish education since the introduction of the aforementioned curriculum, including the implementation of the Aistear Framework in the early years and the onus on schools to engage in self-evaluation, the importance of the role of young students as active agents in their learning continues to grow and aligns with the central elements of this research project (NCCA, 2020).

1.3. Main Psychological Constructs

1.3.1. Mental Toughness (MT). A psychological construct with roots in the sporting domain, MT encompasses a set of attributes which, when present, can support an individual to cope with challenges to successfully overcome them. Central to MT is

confidence and positivity where a person perceives difficult situations as opportunities for growth (Bell, Hardy, & Beattie, 2013; Gerber et al., 2015). Its utility and value, not only in the context of sport, but in business and education settings have been documented (McGeown, Putwain, St. Clair-Thompson, & Clough, 2017). In accepting that an ability to handle pressure, maintain self-belief and persevere are fundamental life skills, regardless of gender or age, and are closely linked to wellbeing, MT would appear a valuable construct to study.

As a construct, the links between MT and other cognate constructs relevant to sporting, performance or educational domains has been the subject of attention and discussion. Across domains, the commonalities and differences between MT and the constructs of resilience and hardiness have received greatest attention. With relation to constructs commonly studied within education, distinguishing MT from resilience, grit and perseverance has featured (McGeown, St. Clair-Thompson & Putwain, 2018). In a broad sense, existing research proposes MT as a construct which provides a more comprehensive overarching framework for the study of different non-cognitive attributes, under which connections can be made to other positive psychological resources (Lin et al., 2017). This perspective of MT as a multifaceted construct will be further examined in chapter two of this thesis.

1.3.2. Autonomy Support (AS). Just as biological nutrients are required in supporting physical wellbeing, psychological nutrients are of importance for mental wellbeing. For young people, these have the potential to become the building blocks which can predict positive outcomes later in life (Akhtar, Iqbal, & Tatlah, 2017). The practical application of SDT can be an effective avenue for this. One strand of SDT, the provision of autonomy, is an element which can promote positive outcomes for those who perceive a high level of AS (Cheon, Reeve, Yu, & Jang, 2014). A perception of autonomy is an interpersonal sentiment where the development of a person's own inner motivational resources during interactions is identified, prioritised and nurtured using certain behaviours. The use of control is the opposite of AS and consists of behaviours that thwart a person's basic psychological needs (Reeve, 2009).

1.3.3. Mental Toughness and Autonomy Support. The potential association between both constructs underlies a central proposition of this thesis. Research has proposed that the application of autonomy supportive practices and the provision of autonomy experiences by those who motivate, and lead others can allow for greater

understanding of MT and its development (Mahoney et al., 2014). In line with the description of MT provided previously, it can be regarded as a construct that supports individuals to cope with, and overcome, challenges in aiming to improve functioning. Similarly, endeavouring to enhance functioning is also key to SDT which, when applied in practice, can provide the enabling conditions that may positively influence and impact on performance. As a result, a focus on promoting functioning can be regarded as one link which conceptually connects current understandings of MT development and SDT (Mahoney, Mallett & Stebbings, 2015). While such a relationship has emerged in the domain of sport, its relevance in the context of education, notably for teacher practice and outcomes for primary school aged students, is a unique feature of the study presented in the empirical paper of this thesis.

1.4. Epistemological and Theoretical Perspective

The research paradigm in use for this study is pragmatic in nature. The use of a pragmatic paradigm is common in practice-based research in psychology and is a feature of studies employing similar research design (How, Whipp, Dimmock, & Jackson, 2013; Patall, Vasquez, Steingut, Trimble, & Pituch, 2016). This paradigm allows for methods of research to be used that are appropriate for studying the topics under investigation. In this way, a combination of methods can be employed that may shed light on the actual behaviour of participants, some of the reasons behind those behaviours and the consequences that may follow (Haslam & McGarty, 2014).

The assumptions of a non-singular reality ontology, where all individuals can have their own unique interpretations of real-life experience, and value-laden axiology, where a goal of the research conducted is to benefit people, resulted in the choice of this paradigm (Howitt & Cramer, 2014). In this way, the paradigm aligns with the focus of the present investigation on the impact of a teacher delivered ASIP on teachers' and students' perceptions of AS along with students' perceptions of their MT. Emphasis is placed on findings being interpreted considering their usefulness and practical application for a range of stakeholders.

1.5. Structure of the Thesis

Following this introduction, the remainder of the thesis is presented in three chapters. Chapter two offers a literature review of MT, conducted in two phases. The focus of this review is on the applicability of MT as a construct in an educational context and the effectiveness of MT interventions trialled to date. Chapter three presents the empirical paper describing the research study conducted which is intended for publication. Finally, chapter four provides a critical review of the entire research process and how the work conducted has a value for practice. Figure 1 presents a visual overview of the thesis.

Figure 1

Visual Overview of the Thesis

Chapter One: Introduction to the Thesis
This chapter presents an introduction to the thesis for the reader. The rationale, the objectives of the research, the main psychological constructs along with the epistemological and theoretical perspective are outlined.

Chapter Two: Literature Review Paper (Two Phase)	
Review Question 1: What is known about Mental Toughness in an educational context?	*Review Question 2:* What is known about the effectiveness of Mental Toughness interventions across a range of settings?

Chapter Three: Empirical Paper
The empirical paper presents the study conducted which is guided by the three research questions emerging from the literature review. It includes an introduction, the method used, the results and a discussion.

Chapter Four: Critical Review Paper and Impact Statement
This chapter presents a critical overview and reflection of the research. It includes an appraisal of key aspects of the study, the implications of the research, the distinct contribution and a personal reflection to account for the impact of the research on the researcher's developing professional practice.

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Chapter Two: Literature Review Paper

2.1. Introduction

The purpose of this literature review is to investigate and provide insight into the psychological construct of Mental Toughness (MT). It is hoped that the review will shed light on the role of MT in education and the potential use of an intervention aimed at enhancing student MT in a school setting. In achieving this, the review will first provide an overview of MT as a construct by drawing on current and relevant information sources. A definition of MT will be outlined along with a model that provides for greater understanding of what MT is, and what it constitutes. Following this, information on the origins and theoretical foundations of the construct will be explored. This section of the review will conclude by examining existing evidence-based methods for its enhancement and development. A focus will then be placed on the role of MT in educational psychology from the perspectives of both research and practice.

With the construct of MT outlined, a two-phase approach will be applied to reviewing the literature. Phase one will focus on research articles related to MT as a construct applicable to education. For phase two, existing research on MT intervention will be sought where a focus is placed on research articles involving a programme of intervention that has been evaluated. For each phase, the process will be initiated by a literature search and a subsequent screening process that will help to identify relevant studies. Once selected, research articles will be examined and appraised using Gough's Weight of Evidence framework, a recognised model of critical appraisal, in gaining an understanding of the research conducted to date.

In each of the studies included in both phases of the review, the research design, the participants used, the quality of measurements and the main findings of the studies will be examined and critiqued in gaining insights into the existing research base. In concluding the review, the main outcomes of the process will be summarised along with recommendations for future research. This will culminate in the articulation of research questions warranting further investigation. Figure 2 provides a visual overview of the literature review paper.

Figure 2

Visual Overview of the Literature Review Paper

Context and Rationale
This introductory section focuses on the construct of Mental Toughness. Explored are the origins and theoretical underpinnings of the construct, a model of understanding and its relevance to educational psychology.

Phase One: Mental Toughness in the Context of Education
This section focuses on the first review question; "What is known about about MT in an educational context?" Included is the literature search, literature review and synthesis of findings.

Phase Two: The Effectiveness of Mental Toughness Interventions
This section focuses on the second review question; "What is known about the effectiveness of Mental Toughness interventions across a range of settings?". Like the previous section, included is the literature search, literature review and synthesis of findings.

Conclusions from Phase One and Phase Two
This section will draw together the main findings from both review phases along with the recommendations for future research in arriving at the review outcomes.

Emerging Research Questions
The research questions emerging from the review will be presented along with the corresponding hypotheses. These questions will form the basis of the empirical paper.

2.2. Context and Rationale

2.2.1. What is Mental Toughness?
MT can be described as a set of attributes which support an individual's capacity to manage the challenges, pressures and stressors they may encounter during life (McGeown et al., 2017). A person can be described as 'Mentally Tough' when they succeed and progress despite adversity by utilising attributes such as confidence, self-belief, a positive attitude and self-awareness (Cowden, Meyer-Weitz, & Asante, 2016). With MT, a person approaches challenging situations in a determined and confident manner that may yield positive outcomes (Gerber, Kalak, et al., 2013). Consistency is an important aspect of MT as it relates to an individual's ability to manage challenging situations and difficulties in a consistent and positive manner (Drees & Mack, 2012). Overall, MT can be an influential psychological resource which supports an individual to cope with many of the challenges associated with life that can, in turn, predict their overall success.

2.2.2. A Model of Mental Toughness.
With greater levels of attention on MT in a variety of domains, the need for frameworks and models that provide for conceptual clarity is evident. The 4C's model of MT is one such example and has been developed over the past two decades by Peter Clough and colleagues (Cowden, Clough, & Oppong Asante, 2017). This model of MT features in much of the existing research and includes the scales of commitment, challenge, control and confidence. Collectively referred to as the 4C's, they are regarded as four interrelated but independent attributes which combine and correlate to produce the overall construct of MT. In line with this model, each scale contains two related subscales.

Commitment. The scale of commitment can be defined as a person's ability to complete tasks regardless of the problems or obstacles they might encounter. The subscales of goal orientation and achievement orientation combine to form this scale. They relate to a person's willingness to set achievable goals and their striving and endeavours to achieve them despite difficulties (Dewhurst, Anderson, Howe, & Clough, 2019).

Challenge. The challenge scale relates to a person's willingness to seek out, and engage with, opportunities and situations that are new and unfamiliar in leading to self-development and personal growth (Cowden et al., 2017). Risk orientation is one subscale where a person displays a capacity to adapt and thrive in constantly changing environments. Learning orientation is the other and encompasses a person's ability to

learn from past experiences where challenges, threats and setbacks can be viewed as opportunities for progression and development (Crust & Clough, 2011).

Control. The control scale refers to the level of perceived influence a person maintains over their life and is made up of life control and emotional control. When a person presents with high levels of life control they believe that they have the ultimate influence in shaping their future which is closely linked to perceiving an internal locus of control (Cowden et al., 2016). Having high levels of emotional control can support a person in being able to handle their emotions and feelings during difficult situations where they can engage in appropriate and effective self-regulation (Crust & Clough, 2011).

Confidence. The confidence scale can be equated to how self-assured an individual may feel and includes the confidence in abilities and inter-personal confidence subscales. A person presenting with high levels of confidence in their abilities will demonstrate a readiness to engage in difficult tasks and maintain self-belief despite possible setbacks (Crust & Clough, 2011). An individual with high inter-personal confidence can demonstrate the capacity to successfully navigate and manage social situations while remaining unintimidated by others (McGeown et al., 2016). Figure 3 provides a visual representation of this model.

Figure 3

Visual Overview of the 4C's Model of Mental Toughness (from https://aqrinternational.co.uk/)

2.2.3. Origins of Mental Toughness. During its conceptual infancy, MT was associated with other psychological constructs. For example, MT was used as an interchangeable term with resilience. Like resilience, MT was regarded as a measure of a person's ability to cope with stress and recover from adversity (Bahmani et al., 2016). As new knowledge started to emerge, MT and resilience diverged in how they were interpreted and understood. Resilience is described as a process related to a person's ability to recover from a difficult situation experienced as threatening to their progress. In demonstrating resilience, an individual maintains the belief that they can accomplish what they had originally set out to achieve despite setbacks (Skala & Bruckner, 2014).

In this manner, and when reflecting on resilience using the 4C's model of MT, it can be seen to feature the attributes of commitment and control.

In contrast, and as discussed, the combination of the four attributes of MT support an individual to approach challenging events in a more positively-framed manner (Bahmani et al., 2016). MT can help an individual to turn situations that challenge into opportunities for personal growth and development which can lead to self-improvement (Crust & Clough, 2011). Key aspects of the construct are confidence and empowerment where a person displays a proactive tendency to seek out challenges for personal growth and remains committed to overcoming them (Jones, Hanton, & Connaughton, 2007). As a result, MT can be seen to build on resilience by further encompassing the attributes of confidence and challenge.

In looking for other comparable constructs, MT is regarded as more closely associated with psychological hardiness. For some researchers in this area, the core elements of hardiness form the basis of MT (Abdollahi, Carlbring, Vaez, & Ghahfarokhi, 2018). Hardiness, like MT, is regarded as a resistance resource that supports a person in effectively dealing with difficulties (McGeown, St Clair-Thompson, & Clough, 2016). However, MT is regarded as differing from hardiness in its additional emphasis on confidence in one's abilities and interpersonal relations. These are core elements of the confidence attribute of MT when using the 4C's model. As with hardiness, MT not only supports an individual to remain committed and competent when confronted with stress, it can enable them to remain confident about successfully overcoming the challenge before them (Lin et al., 2017).

The above discussions support MT as a construct which provides a more comprehensive overarching framework for the study of different non-cognitive attributes, under which connections can be made to other positive psychological resources, such as resilience and hardiness (Lin et al., 2017). For some researchers, this perspective of MT as a multifaceted construct has made it a useful framework when studying non-cognitive attributes of importance amongst children and adolescents, within an educational setting in particular (McGeown, St. Clair-Thompson & Clough, 2016). For example, the commitment attribute of MT can be seen to overlap with perseverance, defined as a person's determination to master a skill or complete a task. Similarly, grit has been shown to be a strong predictor of academic attainment and entails sustaining effort, despite failure and adversity, in the pursuit of success. Such

characteristics can be associated with the commitment and challenge attributes of MT (McGeown, St. Clair-Thompson & Clough, 2016). From this, MT can be seen to overlap with several constructs that have proved useful within educational settings.

Following its establishment as a distinct psychological construct, MT was first utilised practically in the area of sports and performance psychology (Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015). MT has been shown to equip athletes with skills and strategies to cope with the demands placed on them during training and competition and in the pursuit of success (Gucciardi, Hanton, & Mallett, 2012). Consequently, MT training can be central to the work of sport and performance psychologists when trying to enhance an athlete's capabilities (Nicholls, Polman, Levy, & Backhouse, 2008). As others began to consider that competitive and pressurised environments exist outside of sport, the potential of applying MT to other life contexts has been the subject of research. To date, these have included the role of MT in occupational settings (Lin et al., 2017), in policing (Ward, St Clair-Thompson, & Postlethwaite, 2018) and in education (McGeown et al., 2016).

In the different domains that MT has been associated with to date, the theoretical foundations of this construct are often linked with personal construct psychology, an approach rooted in personal construct theory (Ravenette, 2006). Using this theory, MT can be described as the thoughts, beliefs, feelings and attitudes that combine to influence how a person approaches and manages challenging and demanding situations in order to overcome them and to develop (Gucciardi, Gordon, & Dimmock, 2009a). Personal constructs associated with MT can be identified as the mental representations a person uses to interpret and deal with events they encounter in a positive manner. These include self-belief, work ethic, self-motivation and positive personal values that contribute to a person's MT (Ravenette, 2006).

2.2.4. Developing Mental Toughness. The issue as to whether MT is innate or a personality trait that can be developed and enhanced through intervention appears regularly in the literature (Jones et al., 2007). With the author of this review using the 4C's model of MT to gain an understanding of this construct, this model would appear to capture both sides of the issue. Through studies conducted to date, MT can be regarded as a personality trait that is influenced by innate factors, such as genetics, while also displaying potential for development (Bédard-Thom & Guay, 2018). Such studies have predominantly been undertaken in the sporting domain with elite athletes

where the development of MT has been shown to have significant positive effects on athletic performance (Jones et al., 2007).

In this manner, how to enhance and develop MT has become a popular area of practice within sports psychology and psychology in general (Gucciardi et al., 2009a). Many texts, approaches and training courses are available and accessible, especially those offered via an online platform. Across many of the approaches and techniques, an emphasis is placed on activities such as goal setting, visualisation, managing anxiety and attentional control (Crust & Clough, 2011). It is important to note that approaches offered may sometimes lack a theoretical foundation and an evidence base. Consequently, an element of caution should be applied to their application (Crust & Clough, 2011). As has been mentioned, a valid evidence base regarding the effectiveness of attempts at MT development would appear to exist within the sporting domain and will be the focus of review later in this paper.

MT interventions are also beginning to emerge in educational settings. While no published, peer-reviewed studies were found to exist as of April 2020, the American 'College Tough' programme is one such university-based intervention that focuses on developing a student's MT using a range of different activities and lessons in responding to high levels of stress, anxiety and depression that can often present for students (St Clair-Thompson et al., 2015). Through the use of practical scenarios over the course of several brief sessions, first-year undergraduate students are supported in developing skills related to goal-setting, adopting positive-thinking practices and self-management in coping with the challenges and difficulties associated with transitioning to life at college (St Clair-Thompson et al., 2015).

When implemented at the University of Tulsa in the USA, anecdotal results describe students as being better able to manage the transition to third-level studies and as having a greater appreciation of the learning that can be taken from setbacks and failures (St Clair-Thompson et al., 2015). While potential does exist for MT to be developed and enhanced in students, it is evident that more research is needed on the development, practicalities and outcomes of evidence-based MT interventions.

2.2.5. Relevance to the Psychology of Education. While MT is a psychological construct often associated with sport, its applicability to other domains has been the focus of increased attention (Bahmani et al., 2016). Within the domain of education, greater emphasis is placed on the influence of non-cognitive attributes, like

MT, resilience and growth mindset, on educational outcomes and student wellbeing (McGeown et al., 2016). Positive correlations between MT and variables including academic achievement, school attendance and classroom behaviour have been found for students in secondary education (St Clair-Thompson et al., 2017). Studies examining the MT of students in third-level education have shown that those with high perceptions of their MT performed significantly better academically (Gerber et al., 2012). It is appropriate to recognise that research exploring MT in education with school-age populations remains a relatively new area of focus when compared to research with athletes in the context of sport.

From the perspective of educational psychology, the application of MT as a practical psychological construct could potentially equip students with knowledge and understanding to help them cope better with challenges that they may encounter (Gerber et al., 2012). Students can be faced with many temptations and competing demands that draw on their attentional and motivational resources which can impact in a variety of ways. At the adolescent stage of development for example, elevated stress levels, linked to the dynamics of peer relationships, have been shown to adversely affect a young person's ability to perform academically (Gerber et al., 2013). In this way, an understanding of the scales and subscales of MT, such as emotional control, goal orientation or inter-personal confidence, may provide ways of managing pressures which could yield positive results.

2.2.6. A working definition of Mental Toughness. For this research project, MT is regarded as a potentially malleable personality trait that supports an individual's ability to perform consistently and succeed under stress and pressure. Encompassing a set of interrelated attributes, it facilitates an individual to approach situations in a positive and confident manner (Cowden et al., 2017; McGeown, St. Clair-Thompson, & Putwain, 2018).

2.2.7. Systematic review of the literature. To gain further understanding and knowledge of MT, a systematic approach is taken in reviewing the literature. This approach was chosen as it allowed for a thorough review of the literature pertaining to the areas of interest. It also allowed for a quality framework to be applied which assisted in critiquing studies conceptually and methodologically (Howitt & Cramer, 2014). Findings were synthesised across studies, giving more weight to the findings from studies of higher quality when following the quality framework applied.

There are two phases to the systematic review completed. Each review phase related to a specific review question. In each phase, the search strategies related to the review question, including the search terms employed, will be outlined. Inclusion and exclusion criteria along with rationales are explained. A quality framework for critically appraising studies is applied to the literature included in each phase of the review which allowed for a synthesis of findings to be presented. Finally, the main findings and implications across both review phases are discussed along with suggestions for future research studies. This paper concludes with review outcomes and the identification of emerging research questions warranting investigation.

2.3. Phase One: Mental Toughness in the Context of Education

      2.3.1. Review question. This phase of the review addressed the following review question; what is known about Mental Toughness in an educational context?

      2.3.2. Literature search. An in-depth literature search was carried out to address the review question. An initial search was performed on July 27th, 2019 using the online databases, Psych INFO, EBSCO and ERIC. Further searches were performed on March 26th, 2020 and July 1st, 2020 using the same databases. Table 1 shows the search terms used, including Boolean operators, for each database.

Table 1

Database and Search Terms (Review Question 1)

Database	Search Terms
Psych INFO	AB,TI,IF ("Mental Toughness") AND (education OR school OR students)
EBSCO	AB,TI,IF ("Mental Toughness") AND (academics OR education OR students)
ERIC	AB,IT,IF ("Mental Toughness") AND (school performance OR education OR students)

      Figure 4 displays a flowchart which provides more information related to the literature search conducted. The inclusion and exclusion criteria for the searches are defined in Table 2. Table 3 lists the included studies. Those studies that were excluded after a full-text review can be found in Appendix A along with the reason for exclusion.

Figure 4

Literature Search Flow Diagram (Review Question 1)

Table 2

Inclusion and Exclusion Criteria (Review Question 1)

		Inclusion Criteria	Exclusion Criteria	Justification
1	Type of Publication	Studies are in a published, peer-reviewed journal.	Not a published, peer-reviewed study.	To ensure that the quality of the studies is of a high standard.
2	Participants	Participants are enrolled at either the primary or secondary level of education or an equivalent (e.g. elementary school or high school).	Participants are enrolled at a level of education outside of the primary or secondary level (e.g. third level).	To ensure that the place of MT in school-aged students is the focus of the review. This has the most relevance for youth wellbeing.
3	Type of Design	Must be group/single-case experimental or correlational design.	Not a group/single-case experimental or correlational design.	To ensure a comparison being made between the variables being measured i.e. MT and a measure of academic attainment/achievement.
4	Measures	The study incorporates a measure of mental toughness.	The study lacks any measure of mental toughness.	To ensure that valid and reliable relationships and associations can be identified.
5	Outcomes	Results relate to the impact of mental toughness on education-related outcomes and/or wellbeing.	Results relate to another aspect of development.	To ensure that a specific purpose of the studies exists.

Table 3

Selected Studies (Review Question 1)

Included Studies

Bédard-Thom, C., & Guay, F. (2018). Mental toughness among high school students: a test of its multidimensionality and nomological validity with academic achievement and preference for difficult tasks. *Social Psychology of Education*, 1-22.

Gerber, M., Feldmeth, A. K., Lang, C., Brand, S., Elliot, C., Holsboer-Trachsler, E., et al. (2015). The Relationship between Mental Toughness, Stress, and Burnout among Adolescents: A Longitudinal Study with Swiss Vocational Students. *Psychological Reports, 117*(3), 703-723.

Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Perry, J. L., Pühse, U., et al. (2013). Are Adolescents with High Mental Toughness Levels More Resilient Against Stress? *Stress and Health, 29*(2), 164-171.

McGeown, S., Putwain, D., St. Clair-Thompson, H., & Clough, P. (2017). UNDERSTANDING AND SUPPORTING ADOLESCENTS' MENTAL TOUGHNESS IN AN EDUCATION CONTEXT. *Psychology in the Schools, 54*(2), 196-209.

McGeown, S., St. Clair-Thompson, H., & Putwain, D. W. (2018). The Development and Validation of a Mental Toughness Scale for Adolescents. *Journal of Psychoeducational Assessment, 36*(2), 148-161.

Papageorgiou, K. A., Malanchini, M., Denovan, A., Clough, P. J., Shakeshaft, N., Schofield, K., et al. (2018). Longitudinal associations between narcissism, mental toughness and school achievement. *Personality and Individual Differences, 131*, 105-110.

Sağkal, A. S. (2019). Direct and indirect effects of strength-based parenting on adolescents' school outcomes: Exploring the role of mental toughness. *Journal of Adolescence, 76*, 20-29.

St Clair-Thompson, H., Bugler, M., Robinson, J., Clough, P., McGeown, S. P., & Perry, J. (2015). Mental toughness in education: exploring relationships with attainment, attendance, behaviour and peer relationships. *Educational Psychology, 35*(7), 886-907.

St Clair-Thompson, H., Giles, R., McGeown, S. P., Putwain, D., Clough, P., & Perry, J. (2017). Mental toughness and transitions to high school and to undergraduate study. *Educational Psychology, 37*(7), 792-718.

2.3.3. Literature review.

2.3.3.1. Study characteristics. An outline of the characteristics of each study reviewed is included as Appendix B.

2.3.3.2. Critical Appraisal Framework. Gough's Weight of Evidence Framework (2007) was used to critically appraise the nine studies. This provided for a detailed systematic appraisal of the quality and relevance of the studies. The nine studies were rated within three categories: methodological quality (Weight of Evidence A), methodological relevance (Weight of Evidence B) and topic relevance (Weight of Evidence C). These scores were then used to determine a final score for the evidence (Weight of Evidence D). Table 4 illustrates this process.

Table 4

Gough's Weight of Evidence Framework (2007)

Weight of Evidence A (WoE-A)	Weight of Evidence B (WoE-B)	Weight of Evidence C (WoE-C)	Weight of Evidence D (WoE-D)

Quality of the execution of the study in relation to the quality standards for studies of that type (Methodological Quality).	Appropriateness of the research design for addressing the review question (Methodological Relevance).	Appropriateness of the focus of study to the review question (Topic Relevance).	Rating the overall degree to which the study addresses the review question (overall weight of evidence).

Methodological Quality (WoE-A). Methodological quality was determined by coding the studies against a coding protocol. The coding protocol was adapted from Thompson et al. (2005) which is used for studies employing a correlational design. After completion of coding, the studies were given a score between 1 and 3 which was assigned to its methodological weight: Low (1.4 or below), Medium (1.5 – 2.5) or High (2.6 – 3). For further information see Appendix C.

Methodological Relevance (WoE-B). To determine Methodological Relevance and considering the correlational research design used in each of the studies, a focus was placed on the nature and quality of the associations that were made between MT and academic attainment and/or an aspect of overall wellbeing in school. Studies were given a score of 1 (low weighting), 2 (medium weighting) and 3 (high weighting) with regards to their methodological relevance. For further information see Appendix C.

Relevance of Evidence (WoE-C). The score for the relevance of evidence was ascertained by examining the following areas: the nature of the participants used, and the quality of the context and rationale provided on the topic under investigation. Each of these areas and the subsequent findings relate strongly to the central review question. Overall, the weightings for WoE-C make a judgement on the relevance of the focus of the evidence for the review question. Like WoE-B, studies were given a score of 1 (low weighting), 2 (medium weighting) and 3 (high weighting). See Appendix C for a full description of the criteria used.

Overall (WoE-D). The overall weight of evidence (WOE-D) was determined by finding the average of the WoE-A, WoE-B and WoE-C scores. This score was then used to determine to what extent each study accurately addressed the review question.

WoE-D is separated into 3 scoring ranges: Low (1.4 or below), Medium (1.5 to 2.5) or High (2.6 – 3). Table 5 presents each of the WoE findings for the studies used in this review.

Table 5

Weight of Evidence Findings (Review Question 1)

Authors	WOE-A (Methodological Quality)	WOE-B (Methodological Relevance)	WOE-C (Relevance of Evidence)	WOE –D (Overall)
Bédard-Thom & Guay (2018)	High 2.6	High 3	High 3	High 2.86
Gerber et al. (2015)	High 2.6	High 3	High 3	High 2.86
Gerber et al. (2013)	High 2.6	High 3	Medium 2	Medium 2.5
McGeown, Putwain, St. Clair-Thompson, & Clough (2017)	Medium 2.33	Medium 2	High 3	Medium 2.44
McGeown, St. Clair-Thompson, &	High 2.6	Medium 2	High 3	Medium 2.53

Putwain (2018)				
Papageorgiou et al. (2018)	High 2.6	Medium 2	Medium 2	Medium 2.2
Sağkal (2019)	Medium 2.33	High 3	Medium 3	High 2.77
St-Clair Thompson et al. (2015)	High 3	High 3	High 3	High 3
St Clair- Thompson et al. (2017)	High 3	High 3	High 3	High 3

2.3.4 Synthesis of findings.

2.3.4.1. Research design. Correlational designs featured in the studies reviewed where a focus was placed on identifying associations and relationships between MT and school-related variables. The use of this particular research design is an effective and well-established methodology in the area of applied educational research and classroom studies (Cline, Gulliford, & Birch, 2015). However, as indicated in a number of the studies reviewed, the development of MT research examining its value as a construct in an educational setting would benefit from the undertaking of studies that employ an experimental design (Bédard-Thom & Guay, 2018; St Clair-Thompson et al., 2015; St Clair-Thompson et al., 2017). In this manner, progression could be made from correlated findings to the production of more causal evidence which could further

support the value of MT as a psychological construct in an educational context (Crust & Clough, 2011).

The use of randomised controlled trials (RCTs) has been proposed as being potentially effective (Papageorgiou et al., 2018). Such studies could focus on the effects of a MT intervention on a sample of students who participate in a MT training programme over a specific period with pre-test and post-test measures of MT being recorded and analysed (Gerber, Kalak, et al., 2013; McGeown et al., 2017). Findings of this kind may contribute additional evidence to the issue as to whether MT is a construct that can be purposefully developed or is more naturally occurring (Gerber, Kalak, et al., 2013). Such a recommendation for future research, and others, are outlined in more detail later in this review.

2.3.4.2. Participants. The origin of the studies in four different countries; Canada (Bédard-Thom & Guay, 2018), Switzerland (Gerber, Brand, et al., 2013; Gerber, Kalak, et al., 2013), Turkey (Sagkal, 2019) and the United Kingdom (McGeown et al., 2016; McGeown et al., 2018, Papageorgiou et al., 2018; St Clair-Thompson et al., 2015; St Clair-Thompson et al., 2017) may suggest the applicability of research on MT and its potential use in the area of education in a number of different countries. In western societies in particular, which were central to the studies used as part of this review, adolescent mental health has become the focus of attention in both academic research and the media due to the harmful consequences associated with mental health difficulties (Cowden et al., 2017). As a result, new approaches and methods of addressing mental health issues in teenage populations are regularly trialled and implemented.

In the Irish context, recent examples include the introduction of the 'Weaving Wellbeing' programme and the piloting of a digital adolescent mental health initiative (DES, 2020). Through such programmes, an emphasis is placed on establishing preventative measures and the development of protective factors for a young person's psychological wellbeing which may have the potential to yield positive outcomes (Gerber, Kalak, et al., 2013). In this regard, this review highlights the potential use of MT in fostering specific attributes in young people that may support them to overcome challenges and adversity (Gerber, Brand, et al., 2013). This relevance of MT for young people is further supported when considering that each of the studies reviewed had a combined participant age range of eleven to nineteen years. This may suggest that MT

can have a positive impact during late childhood and as a child transitions to adolescence.

With each study examined including both male and female students in their samples and reporting similar positive results for both, this may indicate MT as a psychological construct of benefit across gender (Bédard-Thom & Guay, 2018). As referenced, the development of constructs and approaches which may have similar psychological benefits for young males and young females is of interest and significance. For males in particular, the difficulties that can be encountered by professionals in finding suitable interventions that male participants respond to at a level comparable to female participants is highlighted (Papageorgiou et al., 2018).

It is suggested that the discourse-based nature of commonly used approaches to youth mental health, such as cognitive behavioural therapy, psychotherapy or counselling, may be more suited to female participants who have been shown to respond better to these forms of intervention. This may be as a result of a better ability to articulate, discuss and explore the issues affecting them (Papageorgiou et al., 2018). In this way, the use of MT as a resource may be one possible way of overcoming this issue where young males could acquire and develop preventative strategies for dealing with challenging events and situations. It could also be a viable way of introducing and discussing the topics of psychological wellbeing and mental health with them.

2.3.4.3. Measures.

Measures of Mental Toughness. The MTQ48 is a validated and widely used instrument in measuring an individual's level of MT (Perry, Clough, Crust, Earle, & Nicholls, 2013). Those studies which employed the full version of this particular questionnaire as the means of attaining a participant's perception of their MT received a 'high' classification under the measurement section of WOE-A (Gerber, Kalak, et al., 2013; St Clair-Thompson et al., 2015; St Clair-Thompson et al., 2017). One study described in detail the process used by the researchers in using the MTQ48 and reported on the reliability and validity of the measure (Gerber, Kalak, et al., 2013). In two other studies, recognised versions of the MTQ48 were used, the 18-item short-form (Gerber, Brand, et al., 2013) and the 10-item Mental Toughness Questionnaire (MTQ-10) (Papageorgiou et al., 2018). In using modified versions of the MTQ48, the authors indicate these instruments as having good test-retest reliability and high levels of

internal consistency while also being associated with other psychological constructs like self-efficacy and optimism (Gerber, Brand, et al., 2013).

Apart from the full MTQ48 and its related versions, one study used the Mental Toughness Inventory (MTI) to measure MT (Bédard-Thom & Guay, 2018). While not used as commonly as the MTQ48, similarities are reported to exist between both instruments. Where the MTQ48 is made up of 48-items and participants respond using a 5-point Likert scale, the MTI comprises of 36-items and an 8-point ordinal Likert scale for respondents. In using the MTI, confirmatory factor analysis was conducted by the authors that supported the factor structure of the scale (Bédard-Thom & Guay, 2018). The development of a new scale, the Mental Toughness Scale for Adolescents (MTS-A), formed the basis of one study (McGeown et al., 2018) and was subsequently used in another as the primary measure of MT (Sagkal, 2019). An 18-item self-report measure, it has been found to have good construct and criterion-related validity and reliability.

As a translation of the questionnaire from English to French was required for one study, the researchers ensured that this was done appropriately using a two-step cross-cultural validation process (Bédard-Thom & Guay, 2018). This was like one of the other studies reviewed where translation from English to German was required. As a result, the authors ensured optimal translations by following procedures set out by Brislin (1986). Such examples of alterations made to the tests demonstrate good practice with relation to translation and cultural differences and upheld the measure's validity and reliability.

Other measures. How the outcome variable was measured varied across each of the studies. When academic achievement was investigated, the researchers relied on official school records based off national standards (Bédard-Thom & Guay, 2018; St Clair-Thompson et al., 2015) and student self-reported grades (Papageorgiou et al., 2018). While one might question the reliability and accuracy of self-reporting by students due to influences like the 'good participant effect', the authors of this study made a point of indicating that self-reported grades are considered a valid measure of school achievement and cited an appropriate reference (Papageorgiou et al., 2018). When self-report is used, best practice indicates that is a beneficial practice to cross-check a selection of the self-reported grades with the official school records in ensuring validity (Haslam & McGarty, 2014).

Two of the studies reviewed focused on results in the areas of numeracy and literacy and did not take into account a broader picture of a participant's achievements in education (Papageorgiou et al., 2018; St Clair-Thompson et al., 2015). This is an important factor to bear in mind when considering what is meant by academic attainment considering that only certain elements of a student's efforts and successes are accounted for. In contrast, another study chose to employ a cumulative measure of academic achievement where students' grades in a variety of subjects over an entire school year were combined in computing an overall score (Bédard-Thom & Guay, 2018). This would appear to include the achievements of students who do not perform as well in the more traditional subjects, like math and languages, when compared to other subjects that greater emphasis is now being placed on, like physical education.

In addition to academic attainment, variables related to wellbeing and other aspects of school life included those related to stress (Gerber, Brand, et al., 2013), depressive symptoms (Gerber, Kalak, et al., 2013), classroom behaviour (St Clair-Thompson et al., 2015), peer relationships (St Clair-Thompson et al., 2015), school engagement (Sagkal, 2019), student burnout (Sagkal, 2019) and test anxiety (McGeown et al., 2018). Each study used instruments relevant to the variable under investigation with reliability analysis reported. For example, a participant's level of stress was measured in two of the studies reviewed using different methods. In one study, the Adolescent Stress Questionnaire (ASQ) was used that asked students to respond to 58 different items (Gerber, Brand, et al., 2013). Similarly, the Perceived Stress Scale (PSS) was used in another study where adequate reliability and validity was reported (Gerber et al., 2015).

2.3.4.4. Main findings. In each of the studies, statistical analysis played a central role in deriving outcomes. Across each of the studies, due to the correlational design, descriptive statistics and correlations between the variables formed the focus of the analysis (Bédard-Thom & Guay, 2018; Gerber, Brand, et al., 2013; Sagkal, 2019). In further exploring correlations and in allowing for predictions to be made, linear and hierarchical regressions were used (St Clair-Thompson et al., 2015; St Clair-Thompson, 2017). Overall, positive and significant associations were found between MT and the outcome variables in each of the studies included in this review. Where the relationship between MT and academic attainment was the focus of the research, it was found that MT predicts better school achievement (Bédard-Thom & Guay, 2018). In this way, the

intensity of a student's MT was found to be significantly correlated with school achievement in a positive direction.

Where studies provided results on what aspects of academic achievement MT had the highest level of correlation with, a finding was that MT associates more strongly with grades in literacy (Papageorgiou et al., 2018). This may indicate MT as having more of an impact on certain subjects and areas of academic achievement. These may be subject areas that require a greater level of critical thinking and goal setting (Papageorgiou et al., 2018). As a result, individual differences in MT across different subjects and areas of study may be a topic for future research.

In further exploring the relationships between MT and academic achievement, one study examined what specific aspect of MT, according to the 4C's model of MT, was most significant with relation to academic attainment. In this particular set of results, life control, a subscale of the control scale, was found to be of most significance (St Clair-Thompson et al., 2015). This may suggest that students who feel they have some degree of influence, autonomy and command over their schooling perform better. Along similar lines, the role of self-efficacy was stressed in another study where it was found that students who present as scoring highly in self-efficacy are more likely to achieve greater academic success (Bédard-Thom & Guay, 2018). For teachers, such findings suggest the potential value of providing students with opportunities to exert greater control over their learning and to set goals that are personal and meaningful to them. In addition, positive relationships were also found between MT and a student's academic motivation and engagement, a factor which may contribute to their experiences of achievement (McGeown et al., 2018). The presence of such resources through MT may place students in a better position to achieve and reach their potential.

Like the associations found between MT and academic attainment, MT was also found to have positive associations with variables linked to overall wellbeing in school. With regards to a young person's experience of stress, anxiety and depressive symptoms, MT was found to be a useful resilience resource (Gerber, Brand, et al., 2013; McGeown et al., 2018). In the studies reviewed where a focus was placed on the associations between MT and the onset of stress, anxiety and low mood, negatively directed relationships were found between the variables. This indicated that increased levels of MT resulted in lower levels of potentially negatively influencing variables being experienced (Gerber et al., 2015; McGeown et al., 2018).

It was also apparent that participants who presented with high levels of MT appeared to have elevated stress tolerance levels. In this way, when faced with difficult situations, they were able to stay committed, perceive themselves as capable and view the environment around them as controllable. This resulted in them not experiencing stress to the same degree as those participants who reported lower levels of MT (Gerber, Kalak, et al., 2013). This association between MT and stress in young students is of significance in the context of education where a variety of stressors arising from parents, teachers, peers, exams and future choices can often present. It may also demonstrate that MT can act as an effective buffer in protecting against stress.

MT was also shown to be a positive psychological resource that supports students during periods of educational transition (St Clair-Thompson et al., 2017). For young students who were about to move from the primary level of education to secondary school, the students who self-rated higher perceptions on the MT measure were shown to display better coping skills in managing this significant change. In particular, the MT subscale of confidence in abilities was found to be an important mediating factor in predicting a successful school transition (St. Clair-Thompson et al., 2017). The development of such a resource is expanded on in another study reviewed where the role of strength-based parenting was highlighted (Sagkal, 2019). In this case, such parenting practices that build a young person's capacity to deal with challenge and adversity were linked to the development of MT and its subcomponents. The implications of this indirect effect were subsequently linked to school outcomes where students displayed higher levels of engagement with their studies and were less likely to experience academic burnout as a consequence of the parenting style experienced by them (Sagkal, 2019).

From a social development perspective, MT was also found to be positively associated with the forming and maintenance of peer-relationships in school (St Clair-Thompson et al., 2015). Students who rated highly in inter-personal confidence on the MT measure were more likely able to effectively manage and sustain their peer relationships. These individuals presented as being more capable of working with others, initiating interactions and deciding with whom to engage with (St Clair-Thompson et al., 2015). Emphasis was also placed on an individual's self-esteem in this regard which was found to be linked to the confidence scale of MT. Like inter-personal confidence, individuals presenting with high levels of self-esteem presented

as being more capable of managing new relationships and less reliant on the judgement and opinions of others to inform their decisions and actions (St Clair-Thompson et al., 2015).

Overall, this first review phase has provided key insights into what is known about MT in an educational context. From the studies reviewed, it is evident that MT has been investigated in several correlational studies which used young students as participants, and which employed appropriate MT measures. Furthermore, central to the main findings of these studies is the indication of the significant and influential associations and relationships MT has been shown to have with variables related to education and general student wellbeing. The review highlights the need for further research examining the MT of young students considering its emergence as a new area of study within the context of education.

2.4. Phase Two: The Effectiveness of Mental Toughness Interventions

2.4.1. Review question. This phase of the review addressed the following review question; what is known about the effectiveness of Mental Toughness interventions across a range of settings?

2.4.2. Literature search. A literature search was carried out to address the review question. An initial search was performed on September 16th, 2019 using the online databases, Psych INFO, EBSCO and ERIC. Further searches were performed on March 27th, 2020 and July 1st, 2020 using the same databases. Table 6 shows the search terms used, including Boolean operators, for each database.

Table 6

Database and Search Terms (Review Question 2)

Database	Search Terms
Psych INFO	AB,TI("Mental Toughness") AND AB,TI(development OR intervention OR support OR programme)
EBSCO	AB,TI("Mental Toughness") AND AB,TI(intervention OR development OR promotion OR programme OR treatment)
ERIC	AB,TI("Mental Toughness") AND AB,TI(enhancement OR development OR support OR development OR intervention)

Figure 5 displays a flowchart which provides more information related to the literature search conducted. The inclusion and exclusion criteria for the searches are defined in Table 7. Table 8 lists the included studies. Those studies that were excluded after a full-text review can be found in Appendix D along with the reason for exclusion.

Figure 5

Literature Search Flow Diagram (Review Question 2)

Table 7

Inclusion and Exclusion Criteria (Review Question 2)

		Inclusion Criteria	Exclusion Criteria	Justification
1	Type of Publication	Studies must be in a published, peer-reviewed journal.	Do not appear in a published, peer-reviewed journal.	To ensure that studies are of a high standard and have been subjected to scrutiny.
2	Type of Design	Must be a group based experimental study design.	Not a group based experimental study design.	To ensure that comparisons between participants can be made.
3	Measures	The study incorporates a measure of MT and reports pre- and post-intervention data.	The study lacks any measure of MT and lacks pre- and post-intervention data.	To ensure that MT is measured as the dependent variable and the effect of the intervention can be established.
4	Intervention	The study uses an intervention aimed at developing participants' MT.	The study fails to include an intervention aimed at developing participants' MT.	To ensure that reviewing potential ways of developing MT is the focus of the review.
5	Outcomes	Results must relate to the effect of the intervention on MT.	Results of the study do not relate to the effect of the intervention on MT.	To ensure that MT remains the dependent variable of most significance for this review.

Table 8

Selected Studies (Review Question 2)

Included Studies

Anthony, D. R., Gordon, S., Gucciardi, D. F., & Dawson, B. (2018). Adapting a behavioral coaching framework for mental toughness development. *Journal of Sport Psychology in Action, 9*(1), 32-50.

Bell, J. J., Hardy, L., & Beattie, S. (2013). Enhancing Mental Toughness and Performance Under Pressure in Elite Young Cricketers: A 2-Year Longitudinal Intervention. *SPORT EXERCISE AND PERFORMANCE PSYCHOLOGY, 2*(4), 281-297.

Gucciardi, D. F., Gordon, S., & Dimmock, J. A. (2009). Evaluation of a Mental Toughness Training Program for Youth-Aged Australian Footballers: I. A Quantitative Analysis. *Journal of Applied Sport Psychology, 21*(3), 307-323.

Killy, A. K., van Nieuwerburgh, C., & Clough, P. J. (2017). Coaching to enhance the mental toughness of people learning kickboxing. *International Journal of Evidence Based Coaching and Mentoring, 15*(2), 111-123.

Mahoney, J. W., Ntoumanis, N., Gucciardi, D. F., Mallett, C. J., & Stebbings, J. (2016). Implementing an Autonomy-Supportive Intervention to Develop Mental Toughness in Adolescent Rowers. *Journal of Applied Sport Psychology, 28*(2), 199-215.

Parkes, J. F., & Mallett, C. J. (2011). Developing mental toughness: Attributional style retraining in rugby. *Sport Psychologist, 25*(3), 269-287.

Sheard, M., & Golby, J. (2006). Effect of a psychological skills training program on swimming performance and positive psychological development. *International Journal of Sport and Exercise Psychology, 4*(2), 149-169.

2.4.3. Literature review.

2.4.3.1. Study characteristics. An outline of the characteristics of each study reviewed is included as Appendix E.

2.4.3.2. Critical Appraisal Framework. Gough's Weight of Evidence Framework (2007) was used to critically appraise the seven studies. This provided for a detailed systematic appraisal of the quality and relevance of the studies, whilst maintaining an objective stance. The seven studies were rated within three categories: methodological quality (Weight of Evidence A), methodological relevance (Weight of Evidence B) and topic relevance (Weight of Evidence C). These scores are then used to determine a final score for the evidence (Weight of Evidence D). Table 4 illustrates this process in greater detail.

Methodological quality (WoE-A). Methodological quality was determined by coding the studies against a coding protocol. The APA Task Force Coding Protocol by Kratochwill (2003) used for group design research was applied. After completion of coding, the studies were given a score between 1 and 3 which was assigned to its methodological weight: Low (1.4 or below), Medium (1.5 – 2.5) or High (2.6 – 3). For further information see Appendix F.

Methodological relevance (WoE-B). To determine Methodological Relevance and considering the experimental research design used in each of the studies, a focus was placed on the nature and quality of the intervention used and how effects on MT were measured. A greater emphasis was also put on randomised controlled trials. This design was pursued as it would minimise researcher and selection bias (Guyatt at al., 1995). Studies were given a score of 1 (low weighting), 2 (medium weighting) and 3 (high weighting) with regards to their methodological relevance. For further information see Appendix F.

Relevance of evidence (WoE-C). The score for the relevance of evidence was ascertained by examining the following areas: the quality of the context provided on the topic of MT, the nature of the rationale presented as to why investigating potential means of developing MT is of significance and value. Each of these areas and subsequent findings relate strongly to the review question. Overall, the weightings for WoE-C make a judgement on the relevance of the focus of the evidence for the review question. Like WoE-B, studies were given a score of 1 (low weighting), 2 (medium

weighting) and 3 (high weighting). See Appendix F for a full description of the criteria used.

   Overall (WOE D). The overall weight of evidence (WoE-D) was determined by finding the average of the WoE-A, WoE-B and WoE-C scores. This score can then be used to determine to what extent the study can answer the research question. WoE-D is separated into 3 scoring ranges: Low (1.4 or below), Medium (1.5 to 2.5) or High (2.6 – 3). Table 9 presents each of the WoE findings for the studies used in this review.

Table 9

Weight of Evidence Findings (Review Question 2)

Authors	WOE-A (Methodological Quality)	WOE-B (Methodological Relevance)	WOE-C (Relevance of Evidence)	WOE –D (Overall)
Anthony, Gordon, Gucciardi, & Dawson (2018)	Low 1.33	High 3	Medium 2	Medium 2.11
Bell, Hardy & Beattie (2013)	Medium 2.3	High 3	Medium 2	Medium 2.43
Gucciardi, Gordon & Dimmock (2009)	High 2.66	Medium 2	High 3	Medium 2.55
Killy, Van Nieuwerburgh & Clough (2017)	High 3	High 3	High 3	High 3

Mahoney et al. (2016)	Medium	Medium	High	Medium
	2.3	2	3	2.44
Parkes & Mallet (2011)	Low	Low	Medium	Low
	1.33	1	2	1.44
Sheard & Golby (2006)	Medium	High	High	High
	2.66	3	3	2.88

2.4.4. Synthesis of findings.

2.4.4.1. Research design. Each of the studies reviewed for this systematic literature review employed an experimental group design as the primary method of research where a focus was placed on examining the impact of the intervention on the MT of participants using quantitative analysis. This type of design has been shown to produce many benefits. For one, researchers are provided with a certain level of control to analyse and establish cause-and-effect relationships (Haslam & McGarty, 2014). In addition, insights are generated as to what may work best to address a presenting issue and the results and outcomes arising from the research can often have a high level of reliability and generalisability (Haslam & McGarty, 2014). Commonly used by researchers in psychology when assessing causal hypotheses and the effectiveness of interventions, the use of this research design contributed strongly to the methodological quality of each of the studies reviewed.

As a core feature of experimental group design is the reliance on comparisons being made between two or more groups, the inclusion of a control group with the intervention group in the majority of the studies reviewed can be regarded as a positive aspect of the design and impacted on their score for WoE-A. In particular, three of the studies employed a control group who did not receive the intervention at any point (Bell et al., 2013; Gucciardi, Gordon, & Dimmock, 2009b; Killy, van Nieuwerburgh, &

Clough, 2017). Two studies did not include any control group and consequently score in the 'low' category for WoE-A (Anthony et al., 2018; Parkes & Mallett, 2011).

The remaining studies employed a delayed treatment control group where participants were offered the intervention at a later date (Mahoney et al., 2016; Sheard & Golby, 2006). While opinions on the requirement of a waitlist control group are divided in existing literature, it can be argued that by providing all participants with the opportunity to access the intervention reduces the risk of ethical issues (Haslam & McGarty, 2014). Overall, across the studies, this review finds that the use of a control group is a critical design aspect when evaluating the effectiveness of interventions where a valid comparison can be made.

While the use of an experimental group design, where an appropriate control group is employed, appears to be the only type of research design used in studies of this kind to date, the use of single-case designs in future studies may also be of benefit (Cline et al., 2015). When evaluating the effectiveness of an intervention, it has been suggested that reviewing studies which use different methodologies to establish an evidence base may be beneficial (Horner et al., 2005). The argument is made that the use of group designs alone to establish an intervention's evidence base can lead to misinterpretations that it impacts on all or the majority of participants and ignore that there may be individuals who do not respond to the intervention (Haslam & McGarty, 2014). As a result, evaluation at an individual level is needed where the baseline in single-case designs can produce a reliable benchmark from which future comparisons can be made.

2.4.4.2. Participants. With regards to the demographics of participants used, the origin of the studies in two different countries; Australia (Anthony et al., 2018; Gucciardi et al., 2009b; Parkes & Mallett, 2011) and the United Kingdom (Bell et al., 2013; Killy et al., 2017; Mahoney et al., 2016; Sheard & Golby, 2006) supports a certain degree applicability of the research on MT and approaches to intervention in different countries. Furthermore, the participants across five of the seven studies reviewed ranged in age from fourteen to twenty-four years, thus drawing from the adolescent and emerging adulthood stages of development. The remaining studies made use of adult samples.

In addition, four of the studies reviewed displayed a significant gender disparity where males accounted for the entire sample (Anthony et al., 2018; Bell et al., 2013;

Gucciardi et al., 2009b; Parkes & Mallett, 2011). In two of the other studies, the number of male participants outnumbered their female counterparts (Killy et al., 2017; Mahoney et al., 2016). Only one study recruited a greater number of female participants than male (Sheard & Golby, 2006). While this may indicate a potential gender bias in the existing literature, it could be argued that this also suggests the potential of MT to be used as an effective approach with a cohort of the population for whom it can often be difficult to intervene regarding their mental health (Bédard-Thom & Guay, 2018).

2.4.4.3. Measures. As was highlighted in the context and rationale section of this review, several psychometric measures for assessing a person's MT exist and are continuing to be developed. When using the 4C's model of MT as the over-arching framework, the MTQ48 is a well-developed and widely used instrument in measuring an individual's level of MT (Perry et al., 2013). In this manner, the one study which employed the full version of this particular questionnaire as the means of attaining a participant's score on MT received a 'high' classification under the measurement section of WOE-A (Killy et al., 2017).

Apart from the full MTQ48, one study included in the review used the Mental Toughness Inventory (MTI) to measure MT (Bell et al., 2013). While not used as commonly as the MTQ48 in studies where MT is measured, similarities are reported to exist between both instruments. Where the MTQ48 is made up of 48-items and participants respond using a 5-point Likert scale, the MTI comprises of 36-items and an 8-point ordinal Likert scale for respondents. In using the MTI, confirmatory factor analysis was conducted by the authors that supported the factor structure of the scale. As new and updated measures related to MT are being developed, it would be appropriate for future research to source and use the most current measure.

2.4.4.4. Interventions. Across the studies examined a range of interventions were used with each producing differing outcomes for participants. As a result, the following sections critically examine each intervention separately. A focus is placed on the nature of the intervention, how it was delivered, how its impact was measured and what effect, if any, it had on MT.

Mental Toughness Training (MTT). A specific MT training programme was used in two of the reviewed studies (Bell et al., 2013; Gucciardi et al., 2009b). The first of these interventions was delivered directly to the athlete participants over forty-six contact days with the primary focus of providing them with an opportunity to practice

dealing with pressure and threat (Bell et al., 2013). This element of threat was generated using punishment-conditioned stimuli where participants were met with a series of negative consequences to different situations. Their reactions and behaviours were then observed in a cycle of skill development, pressure training, testing and review. This intervention required significant levels of support from a multi-disciplinary team including coaches, medical staff, psychologists and administrators (Gucciardi et al., 2009b). The study outlines that much of this support was delivered at an individual level where a focus was placed on mental preparation principles and psychological skills.

In terms of main findings and effects, the results from participants in the intervention group were compared against a control group. The use of a mixed-model ANOVA demonstrated a significant Group by Time interaction effect where MT scores on the MT Inventory differed between both groups at the post-intervention level with a medium effect size reported. This was supported using posthoc tests which showed a significant difference between the MT scores of each group at post-test which were not there at pre-test (Bell et al., 2013). In addition, for those in the experimental group, MT scores significantly increased from pre-test to post-test. Combined, these findings would indicate the potential of this intervention for enhancing MT in a sporting context (Bell et al., 2013).

A similar intervention was used in another study which delivered MT training directly to players on an Australian football team over six weeks before the start of their competitive season (Gucciardi et al., 2009b). The intervention was delivered by the primary researcher and consisted of seven sessions. Each session lasted for two hours and had a specific theme. Examples of these themes included self-motivation, self-belief, resilience and emotional intelligence. The purpose of each session and the content and activities included was clearly outlined and added to the study's methodological relevance.

The effects of this intervention on MT scores, as measured by the Australian football MT inventory, were analysed using a multivariate analysis of covariance (MANCOVA). The study authors provide a clear rationale as to why this type of analysis was chosen, mainly owing to the existence of two time points and the fact that pre-intervention scores could be included as covariates (Gucciardi et al., 2009b). In accepting the risks involved when conducting multiple comparisons, a Bonferroni

adjustment was performed to protect against type-1 errors. These factors contribute to a 'high' WoE-B classification for this study. In terms of main findings, a significant multivariate effect was found for the experimental group where certain aspects of MT as measured by the AfMTI contributed to this effect (Gucciardi et al., 2009b). Overall, these outcomes indicate the effect of the intervention in enhancing certain aspects of MT for the sporting participants involved.

Psychological Skills Training (PST). Similar to the MTT intervention described in the previous section, psychological skills training (PST) was delivered as an intervention and directly compared against MTT in one of the studies reviewed (Gucciardi et al., 2009b). This intervention involved psycho-educational and experimental group sessions which targeted skills such as self-regulation, mental rehearsal, attentional control and self-efficacy. A series of six two-hour sessions were provided directly to sports players in the intervention group over a period of six weeks before the commencement of their competitive season (Gucciardi et al., 2009b). This structure allowed for a direct comparison to be made between the MTT intervention being delivered to a different intervention group and the control group who were not in receipt of any intervention.

The effects of this intervention on MT scores, as measured by the Australian Football MT inventory, were also measured using a MANCOVA. For the PST intervention, a significant multivariate effect was also found when compared to the intervention. Specifically, this significant effect related to certain aspects of MT as measured by the measure used including 'thrive through challenge' and 'tough attitude'. This is a similar finding to that found for the MTT intervention and supports the use of PST as a way of enhancing MT in a sporting sample (Gucciardi et al., 2009b).

A similar PST intervention was also used in another study reviewed which aimed to examine the effects of the programme on competitive swimming performance and positive psychology development (Sheard & Golby, 2006). The content and application of the intervention was similar in nature to that used in the study discussed in the previous paragraph. A total of five forty-five-minute sessions were delivered on a one-to-one basis to the group of elite athletes. Each of the sessions had a different focus including goal setting, visualisation, relaxation, concentration and thought stopping. The intervention was first delivered to half of the participating group and then to the second half at a later stage in a delayed treatment manner (Sheard & Golby,

2006). The effects of the intervention on outcomes for athletes, notably their scores on the Psychological Performance Inventory (PPI), were measured using paired sample *t*-tests. Results showed that twenty-eight of the thirty-six participants reported increased perceptions of their MT following participation in the intervention.

Autonomy-Supportive Coaching. The use of an autonomy-supportive coaching intervention has also been trialled to develop MT in a sporting context. One study reviewed hypothesised that increased use of autonomy-supportive behaviours, following coaches' participation in an autonomy-supportive intervention programme (ASIP), could have positive effects on athletes' perceptions of their basic psychological needs satisfaction and their MT (Mahoney et al., 2016). As part of this study, an intervention targeting the AS that a coach can provide during training and competition was delivered to a group of rowing coaches in an intervention group. Other coaches were assigned to a delayed treatment condition control group in allowing for a valid comparison to be made (Mahoney et al., 2016).

The study was conducted over eight weeks and the authors report that the intervention was delivered using two, two-hour workshops delivered one-week apart. On reflection, the researchers note that other creative and innovative approaches could have been used to supplement the intervention (Mahoney et al., 2016). It could be argued that an increase in the number of workshops and their delivery at other time points over the course of the intervention may have proven more effective. During both workshops, delivered by a person independent of the primary researchers, the coaches engaged in knowledge-based activities relating to AS informed by principles of SDT. These were supported by a workshop booklet and coaches were required to design an autonomy-supportive coaching session that they would deliver to their athletes (Mahoney et al., 2016).

In analysing the data collected from the athletes, a series of mixed-design analyses of variance were conducted that found no significant effects. When compared to the control group, there were no significant changes in perceptions of MT for athletes in the intervention group. In explaining the findings, potential difficulties in implementing autonomy-supportive interventions in a sporting context were referenced (Mahoney et al., 2016). As qualitative data was collected from the coaches regarding their experiences of the intervention, this yielded information on some barriers to intervention that could be considered in future research. Of note were points made

regarding workshop content, where the inclusion of practical scenarios and examples would be potentially beneficial, along with the broader issue of sport tending to place more value on controlling over autonomy-supportive coaching behaviours (Mahoney et al., 2016). It is suggested that an intervention of a similar kind targeted at teachers which accounts for the limitations discussed and is delivered in a school setting may have potential.

Cognitive Behavioural Therapy (CBT). A psycho-social intervention often used in clinical practice to improve mental health, elements and techniques associated with cognitive behavioural therapy (CBT) were employed in another study as a potential way of developing MT (Parkes & Mallett, 2011). This study aimed to build on previous research that had identified optimism as an underlying mechanism of MT. In this manner, an optimism intervention was used that employed the cognitive behavioural techniques of identifying automatic thoughts and testing the accuracy of thoughts.

The intervention was delivered to rugby player participants ($n = 7$) in an intervention group. Mixed methods data analysis produced varying results as to the effectiveness of the intervention. While qualitative analysis suggested that participants were more confident in their sport and developed greater resilience for adversity, the quantitative results produced minimal support for the utility of the intervention in developing MT (Parkes & Mallett, 2011). It is appropriate to note that a widely used measure of MT was not used. As a result, this study scored in the 'Low' category for WoE-A, methodological relevance as it is hard to judge the true effectiveness of the intervention.

Positive Psychology Coaching (PPC). One of the remaining interventions focused on the use of coaching to enhance the MT of individuals who were involved with the sport of kickboxing. Positive psychology coaching (PPC) formed the focus of this intervention using the GROW model as an appropriate coaching framework (Killy et al., 2017). This is a behavioural-based coaching model where changes in self-awareness and a greater sense of personal responsibility are promoted in supporting goal attainment. The participants in the intervention group ($n = 14$) engaged in one session of PPC that lasted for an hour and was facilitated by the researcher. Their scores on the MTQ48 were compared against participants in a control group ($n = 14$). Repeated analysis measures of variance revealed a significant Time by Group interaction effect

for scores on overall MT and more specifically the elements of emotional control and confidence in abilities (Killy et al., 2017).

Behavioural Coaching: The other remaining intervention also utilised the GROW model to form the basis of a coach-targeted education programme aimed at increasing the frequency of desirable mentally tough behaviours (MTbs) in elite athletes (Anthony et al., 2018). The main phase of the programme engaged the coaches in structured workshops and real-time coaching sessions with the intention of equipping them with the coaching skills to target a collection of desirable MTbs in their athletes. The use of a series of workshops was intended to reinforce the process-driven approach to behaviour change in line with Whitmore's GROW model (2002) and the coaches were also asked to maintain a reflective workbook. Data related to the MTbs displayed by the athletes was collected from the coaches using the newly developed MTbS via an online platform (Anthony et al., 2018). Results showed that scores on this measure significantly increased through the first half of the programme when compared to baseline data collected thus suggesting effectiveness of the programme.

2.4.4.5. *Main findings.* In accounting for all the interventions reviewed, it can be concluded that a certain degree of potential does exist for MT to be developed using intervention. Statistical analysis played a central role in deriving outcomes in each study where different forms of analysis of variance were used to assess the impact of each intervention on MT. Overall, significant positive effects of the intervention used were found in five of the studies reviewed (Anthony et al., 2018; Bell et al., 2013; Gucciardi et al., 2009b; Killy et al., 2017; Sheard & Golby, 2006). The remaining studies which did not report significant positive findings as to the effect of the intervention from the quantitative analysis conducted provided possible reasons for this. In one of the studies, these were supported by qualitative feedback gathered from participants related to possible barriers to such an intervention in a sporting context (Mahoney et al., 2016). In the other study, the use of a more widely used and recognised MT measure was noted (Parkes & Mallett, 2011).

The balance of findings in this phase of the review indicates that certain interventions can impact positively on MT. However, it is also evident that research on the development of MT has been conducted exclusively in a sporting domain. This is reflected in each of the studies reviewed where a different sporting context featured including Australian football (Gucciardi et al., 2009b), rowing (Mahoney et al., 2016),

cricket (Bell et al., 2013), rugby (Parkes & Mallett, 2011), kickboxing (Killy et al., 2017) and swimming (Sheard & Golby, 2006). The main finding that no study examining the impact of an MT intervention in a context outside of sport could be found has implications for the applicability of the positive findings to other domains.

Considering that in sporting and performance settings there often exists a competitive environment, one that may be naturally conducive of MT, other extraneous variables may be at play which impact on MT development regardless of intervention. Such variables could include experiences of success and the influence of sporting heroes or role models (Li, Martindale, & Sun, 2019). As a result, the investigation of interventions, perhaps those which emerged during this phase of the review, that target MT development in a context not directly related to sport would appear to have merit.

2.5. Conclusions from Phase One and Phase Two

2.5.1. Implications of the main findings. Each of the studies reviewed during phase one of this review supported the view that MT can be an effective resource in the academic, social, emotional and personal development of students (St Clair-Thompson et al., 2015; McGeown, St Clair-Thompson & Putwain, 2018). It can have the potential to act as a buffer for students from the stresses and pressures that come with their daily academic pursuits and lives in school (Gerber et al., 2015). In accepting such findings, an element of caution can also be applied. With some of the studies rated as 'medium' for their overall quality (WoE-D), it is appropriate and may prove beneficial, for some of the limitations discussed to be accounted for in future studies which would strengthen the evidence base that supports MT as a construct of value in education (Papageorgiou et al., 2018). These include the use of RCTs with larger sample sizes in supporting greater levels of generalizability of the findings. Future research could also examine the associations between MT and the educational outcomes of younger students (McGeown et al., 2017).

With regards to phase two of the review, findings from five of the seven studies reviewed support the use of certain interventions to develop MT with the use of experimental group design adding further support to these findings (Bell et al., 2013; Gucciardi et al., 2009b; Killy et al., 2017; Sheard & Golby, 2006). This allowed for a valid comparison to be made between participants who experienced the interventions

and those in a control group. An element of caution is also applied when evaluating these findings. It is evident that certain limitations, as discussed in the previous section of this review, could be accounted for in future studies. In particular, the application and evaluation of interventions in domains outside of sport may produce additional findings of interest (Mahoney et al., 2016). In this way, a key implication of this phase of the review relates to the lack of research conducted examining the impact of approaches to MT development in other relevant settings, like education. As such, it may be possible to conclude that MT development has only been shown to be effective in a sporting setting.

Across both phases of the review, it is also of interest to consider how the main findings provide insight into ways in which MT can be investigated and understood as a construct. This may have implications for how it is used in future studies. In certain studies, MT was not examined as one single dependent variable but instead divided into several separate variables in line with the measure of MT employed. Consistent with the 4C's model of MT, this may suggest MT as a broad construct that when examined at the scale or subscale level can yield more significant results. In one study reviewed, when MT was analysed in this manner, the scale of control was shown to have increased significance with regards to academic attainment (St Clair-Thompson et al., 2015).

In this way, such a finding may have implications for teacher practice. Considering research on the nature and structure of methods of education currently in use, it has been argued that students can often perceive a reduced sense of autonomy over their academic endeavours where they are expected to follow prescribed programmes (St Clair-Thompson et al., 2015). This can impact negatively on educational outcomes for those who perceive this as restrictive and controlling while those who perceive that they are provided with some degree of influence over their schooling appear to perform better (Patall et al., 2016). An ability to interpret MT related findings in such a manner, where a scale or subscale of the construct can be isolated and interpreted, would appear to have a significant impact on practice.

With regards to practice for educational psychologists (EPs), the potential for MT to be used by teachers and those who support students in a multi-dimensional manner can also be considered a significant implication of the review's findings. Recognising their consultative and collaborative role in school systems and teacher practice, EPs appear well-positioned to provide psychoeducation about the potential

value of MT for student outcomes as highlighted in phase one of the review (Bédard-Thom & Guay, 2018). In addition, equipped with knowledge regarding the evidence-based methods of MT development analysed in phase two, they could make suggestions and offer perspectives as to how school staff can support students in utilising this construct to best effect (Crust & Clough, 2011).

       2.5.2. Future research recommendations. Each of the studies reviewed in both phases of the review indicates areas where future research relating to the role of MT in education and its potential to be developed could be conducted. These are presented in Table 10.

Table 10

Future Research Recommendations

Study Authors	Recommendations
Anthony, Gordon, Gucciardi, & Dawson (2018)	The application of a similar behaviour coaching education programme to other sports and domains to make further positive change.
Bédard-Thom & Guay (2018)	Research could examine the distinctiveness of MT when compared to other related constructs (e.g. resilience and grit) to further develop its conceptual clarity.
Bell, Hardy & Beattie (2013)	Future intervention-led research could ensure the random assignment of participants to both the intervention and control groups.
Gerber et al. (2015)	Research could investigate if a person's MT can be improved and enhanced with specific training and development.
Gerber et al. (2013)	Research could involve the use of randomised-controlled trials that move towards the production of causal evidence in relation to MT.
Gucciardi, Gordon & Dimmock (2009)	The undertaking of a longitudinal study would be beneficial in seeing if participants have internalised the newly acquired skills and methods after the intervention period.

Killy, Van Nieuwerburgh & Clough (2017)	Research looking at ways of developing MT could aim to employ a larger sample size and longer period for the intervention. Previous studies examining the effects of coaching on MT have been conducted over periods between ten and twenty-eight weeks.
Mahoney et al. (2016)	The intervention barriers evident in the present could be used as a starting point for future research. These include the tendency of participants to relapse into previous coaching practices, the limited understanding of workshop material and how to bridge the gap between the material covered and practice.
McGeown, Putwain, St. Clair-Thompson, & Clough (2017)	Future research could explore the perceptions of MT of students in other education settings (e.g. primary or third-level) in further understanding how this positive psychological attribute can be translated.
McGeown, St. Clair-Thompson, & Putwain (2018)	To further investigate the importance of specific aspects of MT in different contexts and how different subscales of the construct may relate to different outcomes.
Parkes & Mallet (2011)	Future research may benefit from delivering the intervention in a staggered manner where a series of workshops or session is used, and contact is maintained between the researcher and the participants over the course of the entire study.
St-Clair Thompson et al. (2015)	Future research could investigate the potential relationships and associations between MT and other educational outcomes (e.g. examination performance or test anxiety) in particular.
St Clair-Thompson et al. (2017)	To further use measures of MT in identifying students who may need extra support during periods of educational transition.
Sheard & Golby (2006)	Replication of similar intervention research in other sports and in other domains would be of benefit to enhance the external validity of the present study's results.

2.5.3. Review outcomes. The purpose of this literature review was to gain insights into the psychological construct of MT which was guided by two main aims. The first aim focused on gaining an understanding of research conducted to date in examining the possible associations that MT can have with education-related variables and aspects of student wellbeing. The second aim related to investigating the effectiveness of previous attempts at developing MT using a form of intervention.

Findings from the review indicate that MT has been shown to have positively directed associations with school-related variables that impact on students including academic attainment, educational transition (St Clair-Thompson et al., 2017) appropriate classroom behaviours and peer relationships(St Clair-Thompson et al., 2015). MT was also found to have a significant role in limiting the effects of stress for young people (Gerber et al., 2015). Regarding development, the main findings support the view that MT has the potential to be developed using intervention (Gucciardi et al., 2009b). As such findings have only been documented in a sporting context, the possibility of its application in other settings is evident.

The findings demonstrate the potential of MT as a resource to be further applied, researched and interpreted in an educational context which may influence positive outcomes for students. Acknowledging that ways of developing MT with students featured in the recommendations for future research across studies, this can be regarded as a suitable gap in the research base (Gerber et al., 2015). It is then appropriate to consider if any of the interventions examined during this review have the potential to be used in a school setting. The applicability of a version of the autonomy-supportive coaching intervention, which featured in one study, is evident (Mahoney et al., 2016). The use of such an intervention with a group of teachers in seeing what impact it may have on students' perceptions of their MT could form the basis of an appropriate study to undertake. The specific research questions that may guide this study are outlined in the next section.

2.6. Emerging Research Questions

Arising from the review outcomes, the research questions and hypotheses as presented in Table 11 are proposed.

Table 11

Research Questions and Hypotheses

Research Question	Hypotheses
1. What impact does a teacher delivered ASIP have on teachers' perceptions of the AS they provide their students?	*Null:* Teachers who participated in the ASIP will not report an increase in perceptions of the AS they provide students when compared to the control group.
	Alternate: Teachers who participated in the ASIP will report an increase in perceptions of the AS they provide students when compared to the control group.
2. What impact does a teacher delivered ASIP have on students' perceptions of AS from their teacher?	*Null:* When compared to the control group, students in the intervention group will not report an increase in perceived AS from their teacher following teacher participation in the ASIP.
	Alternate: When compared to the control group, students in the intervention group will report an increase in perceived AS from their teacher following teacher participation in the ASIP.
3. What impact does a teacher delivered ASIP have on students' perceptions of their MT?	*Null:* When compared to the control group, students in the intervention group will not report an increase in perceptions of MT following teacher participation in the ASIP.
	Alternate: When compared to the control group, students in the intervention group will report an increase in perceptions of MT following teacher participation in the ASIP.

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Chapter Three: Empirical Paper

3.1. Introduction

3.1.1. What is Mental Toughness? Since its emergence as a psychological construct, MT has been defined in a multitude of ways. Early definitions suggested MT as a description of a person's refusal to give in (Dewhurst, Anderson, Cotter, Crust, & Clough, 2012), a person's ability to bounce back from failure (Crust & Clough, 2011) and a person's capacity to withstand criticism from others (Jones et al., 2007). With these initial conceptualisations of MT prompting further discussion, it is now regarded as a personality trait, encompassing a set of attributes, which supports an individual's ability to perform consistently and succeed under stress and pressure (Cowden et al., 2017; McGeown et al., 2018). This definition is used for the purposes of this paper.

MT is related to other psychological constructs such as resilience and hardiness (Namli & Demir, 2019). Resilience is defined as an individual's ability to cope with and recover from difficult situations that are perceived as threatening (Skala & Bruckner, 2014). MT adds to this construct by emphasising positivity and confidence where a person can perceive adversity and situations that challenge as opportunities for growth and development (Anthony, Gucciardi, & Gordon, 2016). MT is also regarded as having associations with hardiness, a resistance resource that buffers against difficult situations (Kamtsios & Karagiannopoulou, 2013). As hardiness is often seen as a predominantly innate personality construct, the existing research base would support the view that MT, while complex in the way that it is in part genetically formed, does have the potential to be malleable (Killy et al., 2017).

With MT having emerged as a psychological construct of benefit to performance in the sporting domain, frameworks and models leading to conceptual clarity have been proposed. While agreement does not exist on the use of any one model in fully understanding the elements which underpin MT, the 4C's model features across existing research and has been used in studies focused on MT development (McGeown et al., 2017). It is the model used for the purposes of the present study. Figure 6 provides an overview of this model along with information on the four scales and eight subscales it consists of.

Figure 6

Scales and Subscales of the 4C's Model of Mental Toughness

Mental Toughness

Challenge
A person's willingness to seek out new situations and opportunities.

Commitment
A person's ability to successfully complete tasks regardless of the obstacles encountered.

Control
The level of influence that a person perceives over life and emotional management.

Confidence
The level of self-belief and self-assurance that a person maintains.

Learning Orientation
A person's view that challenging and difficult situations can lead to learning.

Goal Orientation
A person's willingness to set goals.

Life Control
A person's belief that they have the ultimate influence in shaping their future.

Confidence in Abilities
A person's readiness to engage in difficult tasks and maintain self-belief.

Risk Orientation
A person's capacity to adapt and thrive in constantly changing environments.

Achievement Orientation
A person's striving to achieve the goals set in spite of difficulties.

Emotional Control
A person's ability to manage and control their feelings and emotions during difficult situations.

Interpersonal Confidence
A person's capacity to successfully navigate and manage social situations.

3.1.2. Mental Toughness in the context of education. The applicability of MT has expanded to other domains including industry (Crust, 2009), the military (Fitzwater, Arthur, & Hardy, 2018) and education (Shepherd, 2009). To date, research in an educational context contains correlational studies where a focus is placed on the nature of the relationships between MT and academic variables. These variables have included experiences of burnout (Gerber et al., 2015), the ability of students to manage their classroom behaviour (St Claire-Thompson et al., 2015) and academic achievement (Bédard-Thom & Guay, 2018; McGeown et al., 2016; St Clair-Thompson et al., 2015). Overall, these studies have shown that students who present with high perceptions of

their MT, as indicated by an appropriate MT measure, perform better on the outcome variables examined.

Apart from academic development, variables related to non-cognitive functioning have also featured in MT research. These studies highlight the role of schools in the holistic development of young people across all domains. In this manner, MT has been shown to be positively correlated with a young person's stress tolerance levels and how they respond to stressful life events (Gerber, Brand, et al., 2013; Haghighi & Gerber, 2018). MT has also been shown to have links with the development and maintenance of positive peer relationships, where a young person's level of inter-personal confidence can be a significant mediating factor (St Clair-Thompson et al., 2015). In addition, MT has been found to have positive associations with a young person's sleep quality, a variable that has strong associations with overall daily functioning (Brand et al., 2016). This research base is demonstrative of the potentially positive role of MT for a young person's overall development and their wellbeing.

3.1.3. Developing Mental Toughness. With an increased understanding of key aspects of MT and its application to several contexts, research is beginning to emerge on its potential for development. As of now, research of this kind has been exclusive to a sporting environment where researchers have attempted to enhance MT in the pursuit of improved athletic performance (Parkes & Mallett, 2011; Weinberg, Freysinger, Mellano, & Brookhouse, 2016; Zeiger & Zeiger, 2018). In the studies reviewed, the use of specifically designed MT training programmes and psychological skills training programmes have emerged as prominent interventions (Slack, Maynard, Butt, & Olusoga, 2015).

While such interventions are reported as requiring high levels of support from multi-disciplinary teams, positive outcomes have been documented across sports like kickboxing (Killy et al., 2017), cricket (Bell et al., 2013) and football (Gucciardi et al., 2009b). In using comparable control groups, one group of athletes in receipt of intervention recorded significantly higher levels of MT post-intervention (Gucciardi et al., 2009b). The types of approaches used in these programmes have included goal-setting exercises, visualisation skills, mental imagery strategies and sport-specific anxiety control activities (Powell & Myers, 2017; Stamatis, Grandjean, & Morgan, 2018).

Following a literature search of accessible online databases, studies aimed at developing student MT in an educational context do not appear to exist at present. Considering that search results did identify studies where school-aged athletes were used as participants, it is more appropriate to consider these as belonging to the domain of sport (Micoogullari, Odek, & Beyaz, 2017). In this regard, the generalisation of findings to an educational context warrants a degree of caution (Hunt, Novak, Madrigal, & Vargas, 2020; Kazim & Veysel, 2019). While an issue of this kind may pose difficulty in utilising MT to best effect with student cohorts, it also highlights a gap in the research base warranting attention.

Outside of peer-reviewed, published studies, programmes exist to support a young person's MT. The 'College Tough' programme has been trialled in some American third-level institutions, notably the University of Tulsa, to develop the MT of first-year undergraduate students in supporting them to cope with the associated challenges of transitioning to college (St Clair-Thompson et al., 2017). Through the delivery of brief group sessions, focused on skills related to goal setting and ways of responding to challenge, anecdotal evidence indicates positive outcomes for the students' coping skills and their ways of dealing with setbacks. While the intentions of a programme like this are evident, without more detailed information on specific course content, theoretical foundations, and the publication of valid results, it is difficult to consider them a reliable evidence base.

3.1.4. Mental Toughness and Autonomy Support. Considering the potential merit of research on MT development for students in an educational setting, it is appropriate to examine psychological theories that may be of use in further understanding this process. Self-Determination Theory (SDT) has emerged as providing a foundation for understanding the motivational antecedents of MT and indicates its potential for development to be linked to SDT-informed interventions (Mahoney, Ntoumanis, Mallett, & Gucciardi, 2014). Within the context of SDT, basic psychological needs theory is a relevant mini-theory which would appear appropriate for the current study (Ryan & Deci, 2000). In line with this theory, researchers have proposed and demonstrated connections between the optimisation of aspects of human behaviour, for example indicators consistent with MT, and the extent to which an individual perceives the satisfaction of three key psychological needs: autonomy,

competence, and relatedness (Ferriz, González-Cutre, Sicilia, & Hagger, 2016). Such an association would appear to support the relationship between MT and SDT.

In further examining this proposed link, a focus on autonomy and the provision of autonomy support (AS), may be of interest with regards to the development of MT as it relates to the provision of certain behaviours and psychological conditions which can result in positive outcomes (Bennett, Ng-Knight, & Hayes, 2017). It can be argued that an autonomy-supportive style of interaction puts all principles of SDT into practice where an individual's autonomy, competence, and relatedness are supported and the style of interaction is experienced as intrinsically motivating (Reeve & Halusic, 2009). As a result, an autonomy-supportive environment, which promotes the satisfaction of these basic psychological needs, may contribute to the development of MT. Conversely, an excessively controlling environment, which undermines and thwarts psychological needs, would likely restrict the developmental potential of MT (Mahoney et al.,2014).

In examining such environments in a sporting context, associations between autonomy-supportive coaching behaviours, the satisfaction of the psychological needs of athletes and their perceptions of MT have been the subject of investigation (Mahoney et al., 2016). These behaviours are designed to be supportive of all three psychological needs and include the offering of choices and the provision of rationales. While behaviours like these are referred to collectively as autonomy-supportive coaching behaviours, investigation of their application to other settings, like education, in assessing the potential effect on students' perceptions of MT is warranted (Reeve, 2006). Like a coach in sport, teachers have been shown to be a primary social agent for children and have considerable influence in determining the degree to which their basic psychological needs are either satisfied or undermined. Furthermore, the ability of teachers to successfully acquire, develop and display autonomy-supportive behaviours in supporting the psychological needs of students has been demonstrated (Reeve, 2009). Consequently, accounting for the available evidence, the potential for educational environments, that are autonomy-supportive, to promote the development of MT through the satisfaction of psychological needs is evident.

3.1.5. Autonomy-Supportive Teaching. It has been shown that undue control from strict rules coupled with the provision of tangible rewards for following such rules can achieve short-term compliance (Cheon et al., 2014). However, there are associated disadvantages. This style of interaction can undermine intrinsic motivation, decrease

levels of performance, and connect continued performance to rewards being made available (Gillet, Vallerand, & Lafrenière, 2012). The opposite of this controlling style is AS, a way of teaching, interacting and connecting with students that can be a central aspect of a teacher's overall motivating style. Fundamentally, it relates to the interpersonal sentiments and behaviours that teachers can provide in meeting students' basic psychological needs and in turn developing their inner motivational resources (Assor, Kaplan, & Roth, 2002).

Research has shown that students who perceive high levels of AS from their teachers display increased levels of academic self-regulation (Martinek, Hofmann, & Kipman, 2016), present with increased motivation for learning (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015) and have a greater chance of achieving desired educational outcomes (Jang, Reeve, & Halusic, 2016). From a more systemic level in education, the provision of AS from teachers has also been found to have a significant role in the prevention of school bullying (Roth, Kanat-Maymon, & Bibi, 2011), in engaging students who may be at risk of school dropout (Powell, 2011) and in supporting students with learning difficulties to reach their true potential (Wehmeyer, Shogren, Toste, & Mahal, 2017).

While no data exists relating to Irish teachers, the available research would indicate that an autonomy-supportive teaching style can be challenging for teachers to develop, embrace and utilise (Roth & Weinstock, 2013). This can be attributed to a range of factors including the expectations of the education system in which the teacher works (Takanishi, 2015), a teacher's belief system (Reeve & Cheon, 2016) along with a lack of opportunity to access appropriate training (Hills, 2017). However, specific to the Irish cultural and educational context, other factors would appear to promote and encourage a teacher's role in developing a teaching style that nurtures student autonomy. On one level, the overarching curriculum which guides a teacher's work at the primary level of education is underpinned by the value that children are to be promoted as active agents in their learning (DES, 1999). More recent research has further highlighted the importance of child agency for twenty-first century education and has served to influence current educational developments. The drafting and creation of a new primary curriculum framework is one such example which is intended to reform a child's experiences of school (NCCA, 2020). Such factors can be seen to place Irish teachers in a strong position to further foster student autonomy.

Acknowledging and accounting for both sides of the argument would appear to highlight the need for evidence-based programmes that can support teachers in understanding and using AS in their practice to best effect. As discussed, such intervention could help teachers in overcoming limiting barriers and support others to build on positive foundations already in place. Over the past two decades, the development and implementation of autonomy-supportive intervention programmes (ASIPs) have provided an avenue for this. Supported by several peer-reviewed, published studies, an ASIP has been shown to be an effective intervention in helping teachers become more autonomy-supportive (Cheon, Reeve, Lee, & Lee, 2018; Jang et al., 2016). Reflecting on the future of Irish education at the primary level, as set out in the 2020 Primary Curriculum Framework, this kind of intervention closely aligns with the pedagogy principle where teachers are encouraged to use teaching methods that foster engagement, ownership and challenge amongst students (NCCA, 2020) Additional information on ASIPs and the one used in the present study is provided in the method section of this paper.

3.1.6. The present study. Using an experimental design, the present study aims to investigate the potential impact of increased AS from teachers, through their participation in an ASIP, on students' perceptions of the AS provided by their teacher and on students' perceptions of their MT. Changes in teachers' perceptions of the AS they provide their students following intervention will also be investigated.

3.2. Method

3.2.1. Research questions. The research questions and corresponding hypotheses used for the purposes of this study are presented in Table 12.

Table 12

Research Questions and Hypotheses

Research Question	Hypotheses
1. What impact does a teacher delivered ASIP have on teachers' perceptions of the AS they provide their students?	*Null:* Teachers who participated in the ASIP will not report an increase in their perceptions of the AS they provide their students when compared to the control group. *Alternate:* Teachers who participated in the ASIP will report an increase in their perceptions of the AS they provide their students when compared to the control group.
2. What impact does a teacher delivered ASIP have on students' perceptions of AS from their teacher?	*Null:* When compared to the control group, students in the intervention group will not report an increase in perceived AS from their teacher following teacher participation in the ASIP. *Alternate:* When compared to the control group, students in the intervention group will report an increase in perceived AS from their teacher following teacher participation in the ASIP.
3. What impact does a teacher delivered ASIP have on students' perceptions of their MT?	*Null:* When compared to the control group, students in the intervention group will not report an increase in their perceived MT following teacher participation in the ASIP. *Alternate:* When compared to the control group, students in the intervention group will report an increase in their perceived MT following teacher participation in the ASIP.

3.2.2. Research design. A 2 x 2 between-within experimental design was employed. Perceived AS was used as the independent variable and perceived MT was used as the dependent variable. In line with the 4C's model, MT was subdivided into other variables as indicated in Figure 7. Each variable was measured at two time points: pre- and post-intervention.

3.2.3. Participants.

3.2.3.1. Schools. Convenience sampling was used in contacting seven primary schools ($n = 7$), via email, that were geographically close to the home address of the primary researcher and had a total enrolment of over two hundred students. Four schools indicated an interest in participation while two schools declined. The remaining school did not reply. Information on the participating schools is outlined in Table 13.

Table 13

Information on the Participating Schools

School	Gender	Setting	Disadvantaged School Status	Intervention or Control Group
School 1	Co-educational	Rural	No	Intervention
School 2	Female	Urban	No	Intervention
School 3	Male	Urban	Yes	Control
School 4	Co-educational	Rural	No	Control

3.2.3.2. Teachers. From the four participating schools, fifteen class teachers of either fifth and/or sixth class were recruited. Teachers ($n = 8$) in two of the schools (schools 1 and 2) were randomly assigned to the intervention group and teachers ($n = 7$) in the other two schools (schools 3 and 4) were randomly assigned to the waitlist control group. No teacher in either group reported having any previous experience of engaging in an ASIP. Information on the teacher participants is presented in Table 14.

Table 14

Characteristics of the Teacher Participants

	Intervention Group	Waitlist Control Group
Total Number	8	7
Male	2	4
Female	6	3
Teaching 6th Class	4	3
Teaching 5th Class	4	4
Range of Years of Teaching Experience	1 to 32 years	7 to 37 years
Mean Years of Teaching Experience (*SD*)	8.19 years (10.18)	18.71 years (11.24)

3.2.3.3. Students. Three hundred and one students ($n = 301$) were recruited. The students were either in fifth class or sixth class. In the Irish education system, sixth class is the final year of primary education while fifth class is the penultimate year. Students were in the intervention group, or the waitlist control group based on the random assignment of their teacher. Information on the student participants is presented in Table 15.

Table 15

Characteristics of the Student Participants

	Total Sample	Intervention Group	Waitlist Control Group
Total Number	301	155	146
Male	137	33	104
Female	164	122	42
6th Class	135	72	63
5th Class	166	83	83
Age Range	10 to 13 years	10 to 13 years	10 to 13 years
Mean Age (*SD*)	11.43 years (.60)	11.44 years (.63)	11.41 years (.58)

3.2.4. Measures.

3.2.4.1. Learning Climate Questionnaire. In measuring perceived AS, the learning climate questionnaire (LCQ) was used. The student scale of this questionnaire was administered to the student participants and the teacher scale to the teacher participants. The LCQ is typically used for a specific learning setting and relates to the AS provided by the teacher using a five-point Likert scale. Students rated their teachers on items such as 'I feel that my teacher gives me choices' while teachers rated their practice on items like 'I feel that I listen to how the students would like to do things when possible'. The LCQ has been validated in previous studies. For example, medical students who perceived instructors as more autonomy-supportive were found to experience an increase in their perceptions of AS (Williams and Deci, 1996).

Usually, the LCQ consists of fifteen-items. However, for the purposes of this study, an adapted version was developed that incorporated twenty-four-items. The purpose of this modification was to ensure an equal number of items for each aspect of SDT. In line with SDT, an autonomy-supportive teaching style is one that supports the basic psychological needs of autonomy, competence and relatedness through the optimisation of certain behaviours (Kusurkar, Croiset, & Ten Cate, 2011; Reeve & Halusic, 2009). In this regard, it was observed that the original LCQ contains few items explicitly related to a student's experience of competence and a teacher's efforts to create a climate supportive of competence. As a result, most of the new items added related to perceptions of competence (items 16, 17, 19, 21, 22) along with some related to perceptions of autonomy (items 20, 23, 24) and relatedness (item 18) in ensuring a balance of items. See Appendices O and P for the wording of these items.

In measuring the internal consistency of the adapted LCQ scales, reliability analysis was run on the data collected from the teachers and students at both time points. The results are presented in Table 16.

Table 16

Internal Consistency of the LCQ Scales (Adapted Version)

Scale	Pre α (alpha)	Post α (alpha)
Teacher	.82	.81
Student	.91	.90

3.2.4.2. Measuring Mental Toughness. In line with the 4C's model of MT, Clough et al. (2002) developed an instrument to measure MT known as the Mental Toughness Questionnaire 48 (MTQ48). Since its development, it has been used in much of the research involving MT with scores found to correlate significantly with other psychological variables like optimism, life satisfaction and self-esteem (Gerber et al., 2012). The MTQ48 is reported as having demonstrable criterion-related, construct and content validity (Gucciardi et al., 2012). Measurements of internal consistency and test-retest reliability were also deemed appropriate (Gucciardi et al., 2009a). Apart from the MTQ48, other instruments have been developed to measure MT. Examples include the Mental Toughness Inventory (MTI) and Performance Profile Inventory (PPI) (Cowden, 2018). However, the true validity and reliability of these measurement tools remain unaccounted for (Gucciardi et al., 2009a).

3.2.4.2.1. MTQPlus. Recently, the MTQ48 has been updated and expanded to the MTQPlus, the measure of MT used in the present study (Strycharczyk, Perry, & Clough, submitted). This is a sixty-three-item psychometric tool that measures MT across four scales, the 4C's, and two additional subscales for each using a five-point Likert scale. Students rate their MT on items such as 'I generally cope well with any problems that occur' and 'I usually look forward to changes in my routine'. The MTQPlus is normative, where an individual's scores are compared to the scores of a relevant norm group which represents the larger population (Goebel, Fischer, Ferstl, & Mehdorn, 2009; Mazancova, Nikolai, Stepankova, Kopecek, & Bezdicek, 2017).

Reliability analysis was conducted on the data collected from students at both time points to measure the internal consistency of the MTQPlus. Omega was used as an estimate of internal consistency, as it holds fewer assumptions than Cronbach's alpha when working with more complex scales (Dunn, Baguley, & Brunsden, 2014). The results are presented in Table 17. The subscales of life control and interpersonal confidence were found to be lower than is commonly recommended. Therefore, results pertaining to both were treated with caution.

Table 17

Internal Consistency of the MTQPlus

Scale	Subscale	Time point	Ω (omega)
Challenge	Learning Orientation	Pre-	.71
		Post-	.74
	Risk Orientation	Pre-	.77
		Post-	.80
Commitment	Goal Orientation	Pre-	.70
		Post-	.68
	Achievement Orientation	Pre-	.71
		Post-	.75
Control	Life Control	Pre-	.60
		Post-	.63
	Emotional Control	Pre-	.69
		Post-	.74
Confidence	Confidence in Abilities	Pre-	.78
		Post-	.80
	Interpersonal Confidence	Pre-	.59
		Post-	.63

3.2.5. The Autonomy-Supportive Intervention Programme (ASIP). An ASIP aims to help teachers become more autonomy-supportive. In doing this, it is hoped that students who perceive that their autonomy is being supported will experience positive effects (Cheon & Reeve, 2015). The ASIP used as part of this study was developed by the researcher based on information and materials previously used in studies (Cheon et al., 2018; Cheon, Reeve, & Moon, 2012; Cheon et al., 2014; Perlman, 2012; Reeve, Jang, Carrell, Jeon, & Barch, 2004). Copies of the ASIP materials are contained in Appendix T. Central elements of the intervention included:

- Delivery of the ASIP in a multiple workshop format.
- A focus on the autonomy-supportive instructional behaviours outlined in Table 18.
- The use of group discussion during the workshops.

- The provision of on-going support throughout the intervention.
- Emphasis on skills-based training in conjunction with content delivery.

Table 18

Outline of the Autonomy-Supportive Instructional Behaviours

Behaviour	Description
Take perspectives	The teacher prepares content from the point of view of the students, is open to student input and provides students with opportunities to make choices and demonstrate their successes.
Promote intrinsic motivation	Differentiation is employed where the teacher is aware of the different interests of their students and what can motivate them for learning. Opportunities are also provided which maximise experiences of success for the students.
Use non-controlling language	The teacher aims to use language that minimises pressure while conveying a sense of flexibility and choice for students.
Provide rationales	The teacher tries to explain why activities have use and personal benefit for the students.
Display patience	The teacher allows time for students to respond and show progression before intervening. In this manner, students are encouraged to persist and persevere.
Acknowledge negativity	The teacher acknowledges and accepts negative feelings while inviting suggestions as to what might improve a situation.

3.2.5.1. Intervention fidelity.

3.2.5.1.1. Teacher observations. Event sampling rating forms were used to observe the teachers in the intervention group in seeing how they were using the autonomy-supportive behaviours covered in the intervention (see Appendix Q). All teachers in this group (*n* = 8) agreed to participate in the observations. These were conducted by the primary researcher and a second independent observer was also employed to reduce the effect of bias. Observations of this kind have been used successfully in previous studies in producing findings that are both reliable, with high internal consistencies and inter-rater reliability, and valid, where the ratings of the

observers correlated with teacher self-reports (Cheon et al., 2012; Patall et al., 2016). The results of these observations are presented in the results section of this paper.

3.2.5.1.2. Teacher self-record of behaviours. During the intervention, the teachers in the intervention group were asked to keep a self-report record of their use of the autonomy-supportive behaviours (see Appendix R). They were asked to input their observations at various points during each week of the intervention. These documents were collected and tallied at the end of the intervention period. As has been used in similar studies, this multi-method of assessment provides for a more accurate picture of teacher behaviour where the self-report data is used in conjunction with the observations and one method is not used alone which can have the potential to lead to issues with bias, honesty and the interpretation of findings (Cheon et al., 2018).

3.2.5.2. Reflective questionnaires. At two points during the intervention, teachers were asked to complete a reflective questionnaire where they were provided with an opportunity to record their views on participation in the ASIP (see Appendix S). In sharing their experiences of using autonomy-supportive strategies in the classroom, teachers may acquire new ideas and learn from one another on how best to support the autonomy of their students (Furtak & Kunter, 2012). In addition, the use of reflective questionnaires can yield valuable data related to the content and delivery of the intervention that can be accounted for in future projects using an ASIP (Lazarides & Raufelder, 2017). The qualitative data gathered from these questionnaires were analysed using thematic analysis and are presented in the results section of this paper.

3.2.6. Pilot study. At the beginning of the project, a pilot study was organised and conducted in two parts. For part one, the measures being used were administered to one sixth class teacher ($n = 1$) and their students ($n = 28$) in a school that was not one of those already participating in the study. This provided for validation of the measures and offered insights which resulted in changes to item layout, item wording and the provision of instructions. As the MTQPlus had not previously been administered to school children, the pilot study allowed for its readability and appropriateness of language to be determined. For part two, three independent teachers ($n = 3$) participated in the ASIP where the three workshops were delivered at one time-point. This provided valuable feedback on the intervention's content, methods of delivery and the accompanying resources. As a result, additional video clips were sourced and added to the workshops and an 'ASIP Teacher Notes' resource was compiled.

3.2.7. Procedures.

3.2.7.1. Preparing for the project. Before commencing the study, ethical approval was attained (see Appendices W to Z). Recruiting interested schools was the next step. Schools were identified using convenience sampling and an information letter was sent to the school principal outlining what participation would involve (see Appendix G). This was sent electronically to the school's email address taken from the school's public website. Once the school principal provided permission, a time was arranged for the researcher to visit each teacher and their class to inform them about the study and to distribute an information sheet and consent form for parent(s)/guardian(s) to each student and an information sheet and consent form to each teacher (see Appendices H to M). After one week completed consent forms were collected. A date was confirmed with each teacher for data collection. Dates and times were also agreed for teachers' participation in the intervention workshops.

3.2.7.2. During the project. The project was conducted in three stages as outlined in Table 19. Between each stage, on-going support was provided, via email contact, to the teachers in the intervention group. Additional resources were provided and any questions or arising issues were addressed.

Table 19

Work Completed at Each Stage during the Study.

Stage One	Pre-intervention data was collected from all participating teachers and students using the measures (see Appendices O and P). Also, the teachers assigned to the intervention group participated in the first workshop of the ASIP. This was delivered separately to each school and lasted for two hours.
Stage Two	The teachers in the intervention group participated in the second workshop of the ASIP which followed the same format as at stage one. No data was collected from the student participants.
Stage Three	Post-intervention data was collected from all teachers and students using the same measures as in stage one. The teachers in the intervention group participated in the final workshop of the ASIP.

3.2.7.3. Post-project. The ASIP was delivered to the teachers in the waitlist control group four months after the end of the study.

3.3.Results

3.3.1. Approach to data analysis. This section is divided into three parts. A feasibility study of the ASIP intervention is first presented. The qualitative data generated from the reflective questionnaires of the teacher participants is analysed using thematic analysis and is presented. In addition, the observational data from the classroom observations conducted by the primary researcher and an independent observer is analysed using descriptive statistics and is presented.

A preliminary analysis of the data collected at Time 1 from the student participants is then presented. The data collected related to perceptions of MT and AS is analysed using two covariates; the gender of participants, male and female, and the type of school attended, urban and rural. This will examine if any statistical differences exist in the data collected before the implementation of the intervention which would have implications for the analysis of pre- to post-intervention data. At this stage, independent-sample's t-tests are used and effect sizes are reported using Cohen's d, an interpretable effect size measure for t-tests (Ferguson, 2009; Lachenbruch, 1989).

The reporting of results then focuses on the impact of the ASIP. In endeavouring to answer the study's research questions, the data collected from the teacher participants, based on their responses to the LCQ, is analysed using the non-parametric Wilcoxon Signed-Rank Test. The data collected from the student participants, based on their responses to the LCQ and the MTQPlus, is analysed using analysis of covariance (ANCOVA). Considering the design in use, effect sizes are reported and interpreted using partial eta squared (Durlak, 2009; Ferguson, 2009).

3.3.2. Part one: Feasibility of the ASIP intervention. In informing understanding of the ASIP intervention in context, the data gathered from the teacher participants through the reflective questionnaires and the observations conducted by the primary researcher and an independent observer was analysed and is presented in the following section.

3.3.2.1. Teachers' experiences of the ASIP. During the second and third workshops as part of the ASIP, teachers in the intervention group completed reflective questionnaires related to their experiences of the intervention (see Appendix S for a copy of the questionnaire used). This data was analysed using a four-step approach to thematic analysis, adapted from Braun and Clarke (2006), and the results are presented

in Table 20 (Maguire & Delahunt, 2017). Appendix U contains original records of all data collected and details of the analysis conducted.

Table 20

Teachers' Experiences of the ASIP – Thematic Analysis Results

Theme	Views of the teachers
1. Autonomy-supportive instructional behaviours used by teachers.	Overall, the teachers agreed on the importance and potential benefit of each of the autonomy-supportive instructional behaviours. Providing rationales was thought to "help students understand more". Acknowledging negative feelings was helpful with "older students" and in certain subject areas like "Irish". Displaying patience gave students "a chance to respond and succeed".
2. Giving choice and associated benefits.	Of all the autonomy-supportive instructional behaviours covered, teachers found the practice of giving students greater choice to be one they used most in daily classroom life. The teachers felt that this "motivated students", "gave them ownership over their learning" and "made them feel more involved".
3. Changes observed in students.	Over the duration of the study, it was evident that teachers observed changes in their students. The development of better student-teacher relationships was mentioned where the teachers felt they had "gotten to know their students more" and that students were "more willing to complete their work". Also, the teachers observed a greater desire from certain students to achieve success in their schoolwork. One teacher noted this as being especially relevant for "weaker students who are given more time and space to respond".
4. Changes observed in the classroom atmosphere.	Many of the teachers felt that the use of the autonomy-supportive instructional behaviours resulted in a more positive classroom atmosphere which had benefits for both the teacher and the students. One teacher mentioned the "reduction in incidences of negative behaviour and increased levels of participation".
5. Changes to the intervention.	In general, teachers found the intervention to be well structured and delivered in an appropriate manner. One teacher did comment that "it may be more beneficial for the intervention to be delivered earlier in the school year when student-teacher relationships are being developed and classroom routines and structures put in place".

6. Resources used.	All the teachers commented and were satisfied with the quality and practical value of the resources used as part of the ASIP. They did note that additional video clips, "perhaps in an Irish context", and more lesson plan guides would be useful in further illustrating the practicality of the autonomy-supportive behaviours. One teacher highlighted that "resources with the most practical utility in the classroom would be especially welcome".
7. Use of time.	All teachers found participation in the ASIP to be a valuable use of their time. Comments included that it gave "food for thought", "refreshed approaches and strategies", "helped me become more reflective" and "brought a new focus to routine activities".

3.3.2.2. Teacher observations. The event recording observational methodology proved an effective tool in observing the teachers in their classrooms using the autonomy supportive instructional behaviours. See Appendix Q for a copy of the observational record sheet used. Over the course of the observations, the teachers were shown to be using a wide range of the six behaviours covered in the ASIP as part of their practice. On average, the teachers used five of the behaviours during each lesson. The behaviour used most was non-controlling language and the least commonly used was acknowledging negativity. These efforts to utilise the behaviours were observed across a range of subjects including mathematics, English language, geography and history. The percentage of agreement between the observations of both observers for the autonomy supportive instructional behaviours was 89% and is considered high. See Appendix V for a complete presentation of the data recording and analysis conducted.

3.3.3. Part two: Preliminary analysis of pre-intervention student data. The data collected from student participants pre-intervention was tested for possible associations between gender and school type with the study's independent and dependent measures.

3.3.3.1. Students' perceptions of Autonomy Support by gender. An independent sample's *t*-test was run to compare perceived AS at Time 1 between male and female students. A significant gender difference for perceived AS, with a small effect size, was found where female students reported significantly higher scores; $t(299) = -2.47$, $p = .01$, $d = .28$. As a result, gender will be accounted for as a covariate when analysing the impact of the intervention on perceived AS at Time 2.

3.3.3.2. Students' perceptions of Autonomy Support by school type. An independent sample's *t*-test was run to compare perceived AS at Time 1 between students in rural and urban school settings. A significant difference for perceived AS, with a small effect size, was found where those attending schools in urban settings reported higher scores; *t* (299) = 2.31, *p* = .02, *d* = .27. As a result, school type will be accounted for as a covariate when analysing the impact of the intervention on perceived AS at Time 2.

3.3.3.3. Students' perceptions of Mental Toughness by gender. An independent sample's *t*-test was run to compare MT scores between male and female student participants at Time 1. Significant gender differences, with small effects sizes, for the challenge scale; *t* (299) = 2.91, *p* = .001, *d* = .34, along with the risk orientation; *t* (299) = 3.31, *p* = .001, *d* = .39, goal orientation; *t* (299) = 2.42, *p* = .02, *d* = .29, and inter-personal confidence; *t* (299) = 2.24, *p* = .001, *d* = .26, subscales were found where males students reported higher scores. As a result, gender will be accounted for as a covariate when analysing the impact of the intervention on perceptions of MT at Time 2.

3.3.3.4. Students' perceptions of Mental Toughness by school type. An independent sample's *t*-test was run to compare MT scores between students in rural and urban school settings. Significant differences, with small effect sizes, for overall MT; *t* (299) = -3.45, *p* = .001, *d* = .40, the confidence scale; *t* (299) = -3.81, *p* = .001, *d* = .44, and the subscales of learning orientation; *t* (299) = -3.32, *p* = .001, *d* =.40, goal orientation; *t* (299) = -3.21, *p* = .001, *d* = 36, and life control; *t* (299) = -2.95, *p* = .001, *d* = .34, were found. Significant differences, with medium effect sizes, for the challenge scale; *t* (299) = -4.43, *p* = .001, *d* = .51, and the subscales of risk orientation; *t* (299) = -4.51, *p* = .001, *d* = .53, and interpersonal confidence; *t* (299) = -.6.60, *p* = .001, *d* = .76, were found. For each, students attending schools in a rural setting reported higher scores. As a result, school type will be accounted for as a covariate when analysing the impact of the intervention on perceptions of MT at Time 2.

3.3.4. Part three: Evaluating the impact of the intervention. The following sections report the impact of the ASIP on teachers' and students' perceptions of AS along with students' perceptions of MT.

3.3.4.1. Teachers' perceptions of Autonomy Support. The non-parametric Wilcoxon Signed-Rank Test was conducted to examine differences in teachers'

perceptions of AS across time and group. There was no significant difference in perceptions of AS between Time 1 and Time 2 for either the intervention group ($Z = -1.83$, $p = .07$) or the control group ($Z = -1.12$, $p = .24$). There was however a significant difference in perceptions of AS between the intervention group and control group at Time 1 only ($Z = -2.37$, $p = .02$). There was no significant difference in perceptions between the groups at Time 2 ($Z = -.08$, $p = .93$). Table 21 contains descriptive statistics for teachers' perceptions of AS.

Table 21

Descriptive Statistics for Teachers' Perceptions of Autonomy Support

Group	Time 1 Mean (*SD*)	Time 2 Mean (*SD*)
Intervention (*n* = 8)	4.33 (.29)	4.56 (.20)
Control (*n* = 7)	4.58 (.08)	4.63 (.10)

3.3.4.2. Students' perceptions of Autonomy Support. A one-way ANCOVA was conducted to test the impact of Gender and School Type as covariates on their own, and in interaction with the intervention, on students' perceptions of AS. Levene's test and normality checks were carried out and the assumptions met. There was a significant main effect of Group on students' perceptions of AS at Time 2 when controlling for perceptions of AS at Time 1; $F(1,290) = 10.35$, $p = .001$, partial $\eta^2 = .03$. The was no significant main effect of Gender on students' perceptions of AS at Time 2 when controlling for perceptions of AS at Time 1; $F(1,290) = .05$, $p = .82$. The was a significant main effect of School Type on students' perceptions of AS at Time when controlling for perceptions of AS at Time 2; $F(1,290) = 4.05$, $p = .04$, partial $\eta^2 = .01$.

A statistically significant Group by Gender interaction effect on students' perceptions of AS at Time 2, when controlling for perceptions of AS at Time 1, was found; $F(1,290) = 4.86$, $p = .02$, partial $\eta^2 = .02$. Post-hoc tests showed there was a significant difference for female students. Descriptive statistics for female students' perceptions of AS are contained in Table 22. With a small effect size, this finding provides some evidence for the effectiveness of the intervention on altering female students' perceptions of AS.

Table 22

Descriptive Statistics for Female Students' Perceptions of Autonomy Support

Group	Time 1 Mean (*SD*)	Time 2 Mean (*SD*)
Intervention (*n* = 115)	4.13 (.69)	4.03 (.71)
Control (*n* = 42)	3.81 (.60)	3.49 (.76)

A statistically significant Group by School Type interaction effect on students' perceptions of AS at Time 2, when controlling for perceptions of AS at Time 1, was also found; $F(1,290) = 17.26$, $p = .001$, partial $\eta^2 = .05$. Post-hoc tests showed there was a significant difference for students attending a school in a rural setting. Descriptive statistics for perceptions of autonomy support of students in a rural school setting are contained in Table 23. With a medium effect size, this finding provides some evidence for the effectiveness of the intervention on altering perceptions of how autonomy-supportive their teacher is for students attending a school in a rural setting.

Table 23

Descriptive Statistics for Perceptions of Autonomy Support of Students in a Rural School Setting

Group	Time 1 Mean (*SD*)	Time 2 Mean (*SD*)
Intervention (*n* = 64)	4.15 (.67)	4.12 (.64)
Control (*n* = 85)	3.67 (.62)	3.24 (.84)

3.3.4.3. Students' perceptions of Mental Toughness. A one-way ANCOVA was conducted to examine the impact of the intervention on each dimension of students' perceptions of MT. Accounting for the findings of the preliminary analysis, the use of an ANCOVA allowed for the data to be analysed by Gender, male and female, and by School Type, urban and rural. Across all the scales and subscales of MT examined, only one significant interaction effect was found. This related to students' perceptions of confidence in their abilities. With a small effect size, results showed that, between both time points, perceptions of female students in the control group significantly increased while perceptions of those in the intervention group significantly decreased. The main effects of Group, Gender and School Type and the interactions effects of Group by Gender and Group by School Type are presented in Table 24 along with the relevant interpretations.

Table 24

Impact of the Intervention on Students' Perceptions of Mental Toughness

	Group (Main Effect)	Gender (Main Effect)	School Type (Main Effect)	Group*Gender (Interaction Effect)	Group*School Type (Interaction Effect)	Interpretation
Mental Toughness	$F(1, 290) = .04$, $p = .85$	$F(1,290) = .40$, $p = .53$	$F(1,290) = 6.04$, $p = .01$, partial $\eta^2 = .02$	$F(1, 290) = 3.83$, $p = .09$	$F(1, 290) = 2.67$, $p = .11$	Students attending a school in a rural setting reported significantly higher scores when compared to students attending school in an urban setting.
Challenge	$F(1,290) = 1.78$, $p = .18$	$F(1,290) = 1.05$, $p = .30$	$F(1,290) = .07$, $p = .78$	$F(1, 290) = 1.40$, $p = .23$	$F(1, 290) = 1.65$, $p = .20$	No statistically significant effects to interpret.
Learning Orientation	$F(1,290) = .43$, $p = .51$	$F(1,290) = .82$, $p = .36$	$F(1,290) = .71$, $p = .39$	$F(1, 290) = 1.38$, $p = .24$	$F(1, 290) = 1.45$, $p = .12$	No statistically significant effects to interpret.
Risk Orientation	$F(1,290) = 2.78$, $p = .09$	$F(1,290) = .70$, $p = .40$	$F(1,290) = .06$, $p = .80$	$F(1, 290) = 1.01$, $p = .31$	$F(1, 290) = 1.56$, $p = .21$	No statistically significant effects to interpret.
Commitment	$F(1,290) = 2.85$, $p = .09$	$F(1,290) = 3.04$, $p = .08$	$F(1,290) = 3.23$, $p = .07$	$F(1, 290) = .06$, $p = .79$	$F(1, 290) = .08$, $p = .77$	No statistically significant effects to interpret.
Goal Orientation	$F(1,290) = 4.25$, $p = .04$, partial $\eta^2 = .02$	$F(1,290) = .37$, $p = .54$	$F(1,290) = 2.42$, $p = .12$	$F(1, 290) = .18$, $p = .66$	$F(1, 290) = 1.86$, $p = .17$	Intervention group students reported significantly higher scores when compared to control group students.
Achievement Orientation	$F(1,290) = 1.98$, $p = .16$	$F(1,290) = 4.54$, $p = .03$, partial $\eta^2 = .08$	$F(1,290) = 2.79$, $p = .09$	$F(1, 290) = .41$, $p = .84$	$F(1, 290) = .02$, $p = .89$	Female students reported significantly higher scores when compared to male students.
Control	$F(1,290) = .71$, $p = .40$	$F(1,290) = 1.05$, $p = .30$	$F(1,290) = .99$, $p = .32$	$F(1, 290) = 1.72$, $p = .19$	$F(1, 290) = 1.86$, $p = .20$	No statistically significant effects to interpret.
Emotional Control	$F(1,290) = .64$, $p = .42$	$F(1,290) = 1.09$, $p = .29$	$F(1,290) = 3.37$, $p = .08$	$F(1, 290) = .63$, $p = .42$	$F(1, 290) = 2.24$, $p = .13$	No statistically significant effects to interpret.
Life Control	$F(1,290) = .99$, $p = .32$	$F(1,290) = .26$, $p = .61$	$F(1,290) = .01$, $p = .97$	$F(1, 290) = 2.72$, $p = .10$	$F(1, 290) = 2.42$, $p = .11$	No statistically significant effects to interpret.
Confidence	$F(1,290) = 1.69$, $p = .19$	$F(1,290) = 5.64$, $p = .01$, partial $\eta^2 = .02$	$F(1,290) = 7.80$, $p = .01$, partial $\eta^2 = .02$	$F(1, 290) = 1.29$, $p = .25$	$F(1, 290) = 1.33$, $p = .13$	Female students reported significantly higher scores when compared to male students. In addition, students attending a school in a rural setting reported significantly higher scores when compared to students attending school in an urban setting.
Confidence in Abilities	$F(1,290) = .51$, $p = .47$	$F(1,290) = 5.78$, $p = .01$, partial $\eta^2 = .13$	$F(1,290) = 5.36$, $p = .02$, partial $\eta^2 = .01$	$F(1, 290) = 3.87$, $p = .04$, partial $\eta^2 = .01$	$F(1, 290) = 2.95$, $p = .08$	Female students reported significantly higher scores when compared to male students. Students attending a school in a rural setting reported significantly higher scores when compared to students attending school in an urban setting. A significant interaction effect also exists where perceptions of female students in the control group significantly increased while perceptions of those in the intervention group significantly decreased.
Interpersonal Confidence	$F(1,290) = 2.01$, $p = .15$	$F(1,290) = 1.24$, $p = .26$	$F(1,290) = 6.63$, $p = .01$, partial $\eta^2 = .02$	$F(1, 290) = .24$, $p = .62$	$F(1, 290) = 2.58$, $p = .07$	Students attending a school in a rural setting reported significantly higher scores when compared to students attending school in an urban setting.

3.4. Discussion

3.4.1. Main findings and implications. The primary emphasis of this study was to examine the influence of an ASIP on teachers' perceptions of AS and students' perceptions of AS and MT in line with the three central research questions. The following sections address these questions with reference to the study's main findings and relevant literature.

3.4.1.1. Teachers' perceptions of Autonomy Support. Results indicate that for the teachers who participated in the ASIP, their perceptions of the AS they provide their students did not significantly change between both time points. This was also the case for the teachers in the control group. When the groups were compared pre-intervention, there was a significant difference between teachers in the intervention group and control group for perceptions of AS. However, as perceptions did not significantly differ between the groups post-intervention, it is not possible to attribute changes to the impact or effectiveness of the ASIP.

These findings run counter to those of previous studies where, following participation in an ASIP, teachers reported significantly higher perceptions of AS when compared to the perceptions of teachers assigned to a control group (Cheon et al., 2018; Reeve & Cheon, 2016; Reeve et al., 2004). In expanding on findings, one study references possible explanatory mediating processes that are developed during participation in an ASIP and may support teachers in upgrading the quality of their classroom motivating style (Cheon et al., 2018). From their work, teacher efficacy was found to be one autonomy-supportive enabling resource that teachers acquired during the ASIP and may contribute to the observed difference in findings. While the development of teacher efficacy is reflected in the qualitative data gathered from teachers based on their experiences of the intervention, the inclusion of a quantitative measure of this variable in a future study may add clarity.

Another reason for the lack of a similar change in the present study could be associated with the relatively small sample size of teachers recruited ($n = 15$). The sample size of teachers in the other similar studies includes ninety-one teachers (Cheon et al., 2018), forty-two teachers (Reeve & Cheon, 2016) and twenty teachers (Reeve et al., 2004). It could be argued that a larger sample size may increase the likelihood of detecting significant differences between the groups, especially when one considers the influence of the small effect sizes present (Cheon & Reeve, 2015).

It is also appropriate to note that, for teachers in both the intervention group ($M = 4.33$, $SD = .29$) and control group ($M = 4.58$, $SD = .08$), their perceptions of AS were already at a high level before intervention. As with similar studies, endeavouring to effect behavioural change on participants who already perceive high levels of AS before the implementation of the intervention may have limited the potential impact of the ASIP (Cheon et al., 2014; Reeve & Cheon, 2016). In a future study, it may prove interesting to screen prospective teacher participants beforehand in identifying those who perceive lower levels of AS and who may demonstrate greater benefit from intervention.

3.4.1.2. Students' perceptions of Autonomy Support. Having accounted for gender and school type, findings show significant changes in perceptions of AS for students exposed to teaching by teachers who participated in the ASIP when compared to students of teachers in the control group. For female students, a significant interaction effect was found. With female students in both the intervention and control group reporting a decline in their perceptions of AS between time points, this rate of decline was found to be significantly slower for the female students of teachers who participated in the ASIP when compared to the control group.

A similar significant interaction effect was found for students, both male and female, attending school in a rural setting. The rate of decline in their perceptions of AS was found to be significantly slower for the students of teachers who participated in the ASIP when compared to the control group. This was not the case for students attending school in an urban setting.

In interpreting these significant changes, and when accounting for the outcomes of other similar studies, there are several interesting findings to be considered: (a) the overall decline in students' perceptions of AS throughout the intervention, (b) the potential impact of teacher participation in the ASIP in slowing down this rate of decline and, (c) the observed differences in perceptions of AS between the students and their teachers.

(a) These findings provide a new perspective when compared to previous research which reports increases in students' perceptions of AS following teacher participation in an ASIP. When student perceptions have been accounted for, it was found that students perceived their teachers as less controlling and more autonomy-supportive (Perlman, 2011) and that their autonomous motivation had increased (Cheon

et al., 2012). In reflecting on why students' perceptions of AS declined in the present study, it is important to consider possible factors that may be at play.

Acknowledging that these are the first findings related to a sample of teachers and students in the Irish context, there may be aspects of the Irish primary education system having an effect. On one level, specific, and potentially constraining, curriculum and societal requirements are placed on teachers, especially those who teach older students, which may have an impact (Barry, 2014; Surlis, 2012). Considering the emphasis that AS places on giving students a greater sense of ownership of their classroom experiences, these systemic factors, where teachers are under pressure to follow prescribed curricula with large volumes of content, may place limits on their use of AS. The desire from the teachers in the intervention group, as indicated in their experiences of the intervention, for more lesson plan guides may be indicative of this. It may reflect a challenge faced by the teachers in introducing the concept of AS to prescribed schema and plans of work.

In addition, the time of the school year (see Appendix N) at which the present study was conducted can also be considered. As schools in Ireland move from the middle term to the final term of the school year during Spring time, teachers may be experiencing fatigue or burnout which may impact on their engagement with the ASIP and their subsequent use of the autonomy-supportive instructional behaviours (Foley & Murphy, 2015). While no definitive research exists yet, anecdotal evidence often references a sense of 'initiative overload' amongst Irish teachers who feel overwhelmed by the volume of new policies, interventions and initiatives that they are asked, and often expected, to implement.

(b) As was seen for female students and students, both male and female, in a rural school setting, the study indicates that the use of SDT informed instructional behaviours by teachers may contribute to the maintenance of students' perceptions of AS. In interpreting the significant interaction effects that were found, it is evident that to avoid perceptions of AS experiencing a quicker rate of decline, like that which was observed for students in the control group, the use of autonomy-supportive instructional behaviours by teachers may be of benefit. This interpretation of the results highlights the necessity of including an appropriate control group in the present study which allowed for a valid comparison to be made. The use of a control group is a common feature of previous similar studies (Cheon et al., 2014; Reeve et al., 2004).

Regarding the changes in students' perceptions of AS, these findings may illustrate that the goal of intervention does not always need to be improved performance or increased perceptions. Instead, it can also be valid for intervention to target the maintenance of perceptions or protect against potential rates of decline, a function of intervention documented in studies examining cognitive functioning for example (Holen, Waaktaar, Lervåg, & Ystgaard, 2012; Williams & Kemper, 2010). Arising from the present study, the use of autonomy-supportive instructional behaviours by teachers could be regarded as a proactive and preventative method of impacting on students' perceptions of AS in protecting against decline. This potential impact of an intervention is echoed in the feedback from the intervention group teachers where a reduction in incidences of negative behaviour amongst students was observed throughout the study.

Knowledge of this kind may have implications for the role of SDT in teacher practice, at the level of initial teacher education (ITE) and continuous professional development (CPD) where teachers are aware of the potential impact of SDT informed interventions on the perceptions and outcomes of their students. In addition, these findings also raise awareness as to the differing impacts of intervention for teachers who engage in response-to-intervention assessment. It would go some way to addressing an issue that can sometimes present where interventions have a lesser likelihood of being reused if positive outcomes, in the form of evident improvements on variables, are not observed (Burgess, Brough, Biggs, & Hawkes, 2019; Taylor & De La Sablonnière, 2013). As a result, the findings of this study offer an alternative perspective when evaluating an intervention's impact.

(c) The consistent finding across both the intervention and control groups indicating that teachers' perceptions of the AS they provide their students increased while students' perceptions of the AS their teacher provides decreased is interesting. On one level, it highlights the need to include the views of students when examining teacher instruction (Bergmark et al., 2018; Quinn & Owen, 2016). In this manner, and as the findings indicate, it can assist in reducing the impact of the perception and implementation paradigm within teacher-related research (Collier-Meek, Sanetti, & Boyle, 2019). At times, teachers may think (i.e. perceive AS) and act (i.e. implement autonomy-supportive instructional behaviours) in different ways. The potential effect of this paradigm is perhaps evident in the quantitative data collected from teachers and students and is reinforced by the qualitative feedback provided by the teachers. In

addressing this effect, the collection of robust perception data from teachers and their students may act as a reflective tool demonstrating a disconnect between what teachers think about their teaching and actual practice (Perlman, 2011). In this manner, accounting for the perceptions of AS of both teachers and students is considered a strength of this study.

3.4.1.3. Students' perceptions of Mental Toughness.
The findings associated with the lack of significant changes in students' perceptions of MT is comparable with the one similar study available, conducted in a sporting context. It may add further evidence to the view that MT is a complex psychological construct which has implications for its development potential (Mahoney et al., 2016). Regarding the present study, while several significant main effects were found, significant interaction effects were not present in almost all the analyses conducted. The sole exception related to female students and the 'confidence in abilities' subscale where those in the control group reported a significant increase in their perceptions while a significant decrease was observed for those in the intervention group. Considering the lack of similar research, it is difficult to explain this finding and it may warrant further investigation. Collectively, the findings related to students' perceptions of MT would not support the effectiveness of solely using an ASIP delivered to teachers in impacting on its development.

A plausible reason for this lack of change could be associated with the study's use of a short-term intervention within a limited timeframe (i.e. ten weeks). While research does support MT as a malleable personality trait, it is both genetically informed and influenced by different factors and life events experienced by an individual (Horsburgh et al., 2009). As such, to see changes in a trait like MT, intervention delivered over a longer period may be required. It may also be more appropriate for future research to examine the possible development of a young person's MT in a wider context which does account for the teaching style they are exposed to along with other potentially influencing factors. In line with previous research, these could include genetic dispositions (Horsburgh et al., 2009), personality traits (Yankov, Davenport, & Sherman, 2019), parenting style (Sağkal, 2019) and involvement in extracurricular activities (Li et al., 2019).

3.4.2. Strengths and limitations of the study. In recognising the main findings, the following section reflects on strengths and limitations of the study and elaborates on those discussed already. These are first outlined in Table 25.

Table 25

Overview of the Strengths and Limitations of the Study

Strengths	Limitations
▪ The use of experimental design.	▪ Certain aspects of the ASIP intervention.
▪ The characteristics of participants recruited.	▪ Extraneous variables outside of the school environment.
▪ The use of an evidence-based ASIP intervention.	▪ Timing and duration of the study.

3.4.2.1. Research design. With regards to the nature of the main findings reported, the use of the waitlist control group was a key design feature as it provided a valid comparison. This allowed for the significant interaction effects found for students' perceptions of AS between both groups to be reported and interpreted in the manner they were. Without this design aspect, results were open to interpretation in a very different way. For example, if relying on the data from the students in the intervention group alone, it could have been concluded that teacher participation in the ASIP decreased students' perceptions of AS. In this way, the intervention could have been regarded as having a significant negative effect and resulted in educators disregarding its use and potential.

3.4.2.2. Participants. The number of student participants can be considered a relative strength. In 2019, there were 137,396 students across 5th and 6th classes in Irish primary schools (CSO, 2019). Three online calculators were used in calculating an appropriate sample size based on this number, with a confidence interval of 95% and a 5% margin of error. As a result, it was found that 384 participants would be the ideal number of students to recruit. For the present study, it was possible to recruit 301 student participants which is 78% of the desired number. With the provision of

additional human resources, future research could ensure a sample size closer to the desired number.

Regarding participants, conducting a school-based study can raise questions regarding the effect of data nesting on data analysis (Candlish et al., 2018). In examining how students' perceptions of AS and MT may be associated with their teacher's style of interaction following an intervention, the individual student data could be regarded as nested within the data of the larger group (i.e. their entire class group) and may not accurately predict individual outcomes when analysed (O'Dwyer et al., 2014). In this way, the use of multilevel regression modelling during analysis is suggested in allowing for a more accurate interpretation of the results (Lohr et al., 2014). However, such an issue is considered as having a significant impact with regard to certain variables, such as classroom behaviour, which may be influenced more by group membership (Candlish et al., 2018). As the student variables investigated in the present study were perceptual and experienced at an individual level, the effects of data nesting may be mitigated and support the methods of data analysis used.

3.4.2.3. Measures. From a MT perspective, this is the first known study to use one of the most up-to-date measures of MT, the MTQPlus, on a sample of this age. While some of the reliabilities of this scale were found to be lower than desired, further research could examine how a youth version can be further adapted. Similarly, the adapted version of the LCQ allowed for valid data to be collected related to students' and teachers' perceptions of AS. In particular, the development and use of an adapted version of this measure supported its greater alignment with SDT and provides for an additional unique contribution of this study in terms of developing a broader LCQ tool.

3.4.2.4. Intervention. The ASIP delivered to the teachers in the intervention group can also be considered a strength of the study. Its structure, content and delivery incorporated key features which have been highlighted for researchers intending to use similar versions (Reeve, Bolt, & Cai, 1999; Reeve & Jang, 2006). It also addressed some limitations of ASIP interventions that have been identified. Aspects of note include its delivery in a multiple workshop format and the incorporation of group discussion and engagement from participants (Su & Reeve, 2011). Of note was the intensity of the intervention throughout the project. Incorporating face-to-face workshops and contact via email helped to optimise engagement from the teachers and was reflected in the feedback. Results from the feasibility study support this stance. The

data generated from the reflective questionnaires was predominantly positive regarding the design and delivery of the ASIP and this was confirmed by the use of the behaviours by the teachers during the observations conducted.

While the structure and content of the ASIP add to the overall quality of the study, it does feature some limitations which may have impacted on findings. On one level, it was delivered to the intervention group teachers in a setting outside of their immediate classroom environment. While this mode of delivery is often used for teacher training, particularly in the Irish education system, it may limit the ecological validity of the experimental manipulation (Jacob, Hill, & Corey, 2017). While teachers were exposed to video clips of the autonomy-supportive behaviours in use in a classroom setting, a more direct approach to the training could have further improved the overall quality (Spangler, 2003). As has been used in previous research, demonstrating aspects of the intervention in a real-time classroom setting may prove more beneficial (Cheon et al., 2018; Reeve & Jang, 2006). While it was not explicitly mentioned by teachers in their reflective feedback, it may improve the validity and usefulness of the ASIP when one considers that supporting student autonomy happens in the natural flow of teaching and lesson delivery.

3.4.2.5. Extraneous variables. The current study was conducted in a school environment with a sample of teachers and their students. As well as looking at the school environment and interactions between teachers and students, it is also important to consider the elements of the home environment and parenting style that may be at play. Research exists providing evidence that an involved and authoritative parenting style is linked to a young person's general sense of autonomy in life (Lippold, Davis, Lawson, & McHale, 2016). In addition, with the present study aiming to expand on a similar study conducted previously in the sporting domain, it is important to consider the effect that a young person's involvement in extra-curricular activities may have on their general perceptions of AS.

3.4.2.6. Timing and duration of the study. The time of year at which the ASIP was delivered to the intervention group may have had an impact on their use of the autonomy-supportive behaviours. Providing training for teachers in the middle of a school year may conflict with other demands placed at this time. As was evident in previous studies examining possible effects of an ASIP, delivering the intervention before the commencement of a new school year or during the first term, when teachers

are still getting to know the students in their class and are establishing classroom routines and practices, may yield different results (Cheon et al., 2012).

3.4.3. Additional recommendations for future research. The undertaking of a similar longitudinal study may expand on the findings of the present study in different ways. Firstly, a longer study would allow for an investigation of students' perceptions of AS over a full school year where data could be gathered at several time points. This may either confirm or disconfirm the view that, in general, students' perceptions of AS decrease as a school year proceeds and further emphasise the potential role of intervention. Secondly, as can happen with intervention-led research, it may not be until after the period of intervention that the true impact of participation is observed (Jacob et al., 2017). In this manner, conducting a follow-up with teachers who participated in an ASIP and their students may yield different findings. If a longer period was afforded to teachers to use and develop the newly acquired autonomy-supportive instructional behaviours, their students' perceptions of AS may even increase as has been observed in previous similar studies (Su & Reeve, 2011).

The collection of data at multiple time points over the course of a longitudinal study investigating the perceptions of MT amongst youth populations may also yield valuable information on possible variables impacting on its development. A future study could examine the impact of other factors in mediating the relationship between MT and other variables of interest, like perceptions of AS. For example, regarding the cognitive domain of development, a young person's level of intellectual ability may play a role and it may be appropriate to include the completion of a cognitive task along with data collection (Dewhurst et al., 2012). In a previous study, participants were given a memory test before a MT measure was administered. From this, it was found that those participants with better recall of the memorised information presented with higher MT. This suggests that cognitive inhibition, a person's ability to tune out irrelevant stimuli, may be an underlying mechanism of MT (Dewhurst et al., 2012).

3.4.4. Conclusions. Results of the present study indicate that delivering an intervention to teachers based on the development and implementation of an autonomy-supportive teaching style can have effects on student outcomes. As students' perceptions of AS declined over the course of the study, such an intervention may have the potential to support students in maintaining their perceptions and in protecting against this observed decline. This was evident for female students and students in a

rural school setting of teachers who participated in the ASIP. These students reported a significantly slower rate of decline in their perceptions of AS when compared to control group students. Therefore, the ASIP intervention can be considered successful when students maintain perceptions rather than report increases. In this way, an intervention of this kind, which translates SDT into useable pedagogical practices for teachers, would appear to have merit. The broader question of how systems of education can be reimagined so that a decline of students' perceptions of AS does not occur to begin with is also evident.

Results also address a gap in the research base focused on the construct of MT in an educational context and possible methods of development for students. Findings align with the view that MT is a complex personality trait and do not support the application of a short-term intervention over a limited period in impacting on its development. It would appear beneficial for future studies to utilise more longitudinal designs which could examine the use of autonomy-supportive instructional behaviours by teachers, and their impact, over a full school year or longer along with changes in students' perceptions of their MT in response to several different variables.

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Chapter Four: Critical Review Paper and Impact Statement

4.1. Introduction

This final chapter provides a critical reflection on the entire research process. The ideas discussed and points made throughout are based on the experiences of the researcher and are supported by the existing literature base, where relevant. The paper will first offer an overview of the study conducted where the development of the central idea and research questions are explored along with the epistemological and theoretical perspective taken. Following this, a critical appraisal of the key features of the method used will be presented. This appraisal includes rationales for the choices made when considering available alternatives.

The penultimate section of this paper will focus on the implications of the research for psychological theory and professional practice together with the author's views on the potential contribution of the thesis. In concluding, a personal reflection, guided by Gibb's reflective cycle (Markkanen, Välimäki, Anttila, & Kuuskorpi, 2020), will be presented, which accounts for all aspects of the research process. This is followed by the research project's impact statement which summarises how the knowledge, analysis and insight presented could be of benefit in several domains. The completion of a critical review and reflection in this manner is a common feature of professional-focused doctoral programmes (Sambrook & Stewart, 2008).

4.2. Study Overview

4.2.1. Research development. On commencing this professional doctorate in educational and child psychology, I had some ideas of topics that I was interested in pursuing for the research project component. In a broad sense, these ideas related to youth wellbeing arising from personal interest and considering the increased focus on wellbeing promotion amongst society and the relevance of school-related factors (Byrne, Carthy, & McGilloway, 2019; Land, Lamb, & Zheng, 2011). An area prominent in my thinking at the initial stages was motivational conflict for young people and the potential mediating role of self-regulated learning (Brassler, Grund, Hilckmann, & Fries, 2016; Grund & Fries, 2012).

This was an area of interest owing to my time spent in the education system as a student, a teacher and, most recently, a trainee psychologist. Arising from time spent in secondary schools, I became interested in factors that appear to motivate and engage some students and those which leave others unmotivated and disinterested in their education (Brassler et al., 2016). In this manner, I wonder as to the elements which contribute to the development of a student's motivation for enhancing their academic skills, their desire to accept academic challenges and their general interest in school-related matters. These are areas where research has already been conducted which have implications for systems of education (Helterbran, 2010; Mega, Ronconi, & De Beni, 2014).

The second area of research interest was resilience, a psychological construct that, when applied to topics such as a child's emotional development (Brown, 2015), the promotion of positive parenting practices (Chari & Chandrashekhar, 2014) and the wellbeing of young people (Lyons & Roulstone, 2018), has been found to contribute to positive effects. When resilience is present, young people appear to be better able to make sense of their world and cope when difficulties are experienced (Masten & Barnes, 2018). A range of programmes are in use across educational institutions and youth organisations which aim to build resilience both for education and for life in general (Torsney & Symonds, 2019). In the Irish context, the 'Friends Programme' is one example which some young people have experience of in supporting the development of resilience where positive outcomes have been documented (Kozina, 2020; Stallard, Simpson, Anderson, & Goddard, 2008).

Outside of psychological research, resilience is also used by society and in the media. It is often applied during times of crisis and change. The frequency of its use in discussions during the recent Covid-19 world health pandemic comes to mind where it was associated with our capacity to cope and manage during a unique and challenging time. It will be interesting to see what kind of research related to resilience emerges from this difficult period. Regarding young people, the construct of resilience is sometimes associated with the labels of 'generation snowflake' and 'millennials' that people can assign to today's youth. While controversial terms, they describe children, teenagers and young adults as presenting as less resilient when compared to previous generations. With a limited research base, the potential for research to further explore these terms is evident (Smith, 2019).

As resilience featured in many of my early database searches when thinking about a suitable research idea to pursue, it became apparent that many studies centred around this construct exist already. For example, an initial search of appropriate databases using the search terms "resilience AND children" and "resilience AND youth wellbeing" yielded over two hundred results. For me, this made me question where I would find a suitable gap to conduct a study that would allow me to demonstrate evidence of originality and contribute to the research base.

Further reading on resilience and papers focused on the development of resilient athletes in a sporting context, led me to the construct of mental toughness (MT). A construct that has been described, explored and explained extensively in the previous chapters of this thesis, MT is a personality trait which supports an individual to consistently overcome obstacles and perform in challenging and pressurised situations (Cowden et al., 2017; McGeown et al., 2018). Of interest were the perceived differences and similarities proposed between resilience and MT where it is argued that MT expands on resilience by introducing an element of confidence (Anthony et al., 2016).

It also became clear that, when compared to resilience, less research has been conducted on MT in the context of education and that the studies conducted have employed correlational designs where relationships between MT and variables were investigated (St Clair-Thompson et al., 2015). The potential for MT to be developed using intervention in a school setting has been suggested and appeared as a gap in the existing research base. Moreover, no published studies related to student MT appear to have been conducted in the Irish context to date. This highlighted the potential of this research in examining a psychological construct of value in a new setting. Following supervisory meetings, it was decided that MT would be the central construct of the research project and that its potential for development in a sample of students would be the focus. In helping to further refine the idea, a literature review was completed in two phases which focused on two specific review questions.

The first question related to examining what is already known about MT in an educational context and its potential associations with academic variables and student wellbeing. The second question referred to the application and effectiveness of MT interventions used previously. The main outcomes of this process were two-fold. Firstly, the process demonstrated that MT has been shown to be positively associated with several academic variables including attainment, attendance and behaviour (St

Clair-Thompson et al., 2015). Secondly, the process indicated the potential application of an intervention previously used in a sporting setting to an educational context with the aim of developing a student's MT (Mahoney et al., 2016).

As an emerging 'researching professional' considering the professional training aspect of this doctoral programme, I had a desire to pursue intervention-led research for the study (Blass, Jasman, & Levy, 2012; Fenge, 2009). I was interested in investigating how the delivery of an intervention to a group of participants could have potential benefits that impact practice, behaviour, and policy on a wider scale. This personal standpoint, combined with the outcomes of the literature review conducted, resulted in the design of the study presented in the empirical paper. It was decided that an intervention, in the form of an autonomy-supportive intervention programme (ASIP), would be delivered to a group of teachers in an intervention group. Before and after the delivery of this intervention, data related to perceptions of MT and autonomy support (AS) would be collected from the teachers and their students. This data would be compared to a waitlist control group in identifying any changes and in assessing the impact of the intervention.

From a theoretical and practical perspective, it was decided that intervening at the level of the teacher would make the best use of the limited timeframe available for the completion of the study where any potential effect of the intervention would have benefit for as many students as possible (Waters, Marzano, McNulty, & Mid-Continent Regional Educational Lab, 2003). In this way, the use of teachers as participants in endeavouring to impact positively on student outcomes is common in action-based educational research and featured in similar studies reviewed (Kaur, Hashim, & Noman, 2015; Reeve et al., 2004). This approach allowed for the recruitment of a large sample size of students ($n = 301$) which has benefits in terms of representation and the generalisation of findings. As an alternative, the development and delivery of an intervention to a single class group of students was considered. However, it would have resulted in a smaller sample size and may have been impacted by the time available for completion of the study.

On deciding to examine the impact of a teacher delivered intervention on student outcomes, consideration was given to the potential influence of data nesting and possible group memberships on findings (Candlish et al., 2018). This was an issue raised at a research progression panel where aspects of the study's design were

reviewed and discussed by an independent panel of academics resulting in considerations and possible alterations being suggested.

This issue of data nesting and group membership can often be encountered by researchers who conduct school-based studies. When examining how student outcomes may be associated with certain aspects of their geographical region, the school they attend or their classroom teacher's practice, there is a need to consider that certain individual student data, which is nested within the data of a larger group, like their entire class group, may not accurately predict individual outcomes (O'Dwyer et al., 2014). In this manner, it has been suggested that the use of multilevel regression modelling during data analysis can allow for a more accurate interpretation of the results (Lohr et al., 2014).

In contrast, the view is held that such issues may only significantly impact with regard to certain academic variables such as classroom behaviour where these kinds of variables may be influenced more by social factors like group membership (Candlish et al., 2018). As the data collected and examined as part of this study was perceptual in nature and related to two variables that are experienced at an individual and personal level, this may have mitigated for these potential effects. The non-singular reality ontology assumption of the pragmatic paradigm is also of relevance here. Recognising that all individuals have their own unique interpretations of real-life experience may have accounted for any potential effects of data nesting (Howitt & Cramer, 2014).

4.2.2. Research questions. As discussed, a two-phase literature review was completed which focused on the application of MT in an educational context and investigated existing approaches to MT development. This process identified a paper examining the potential impact of an autonomy-supportive intervention, delivered to sport coaches, on the MT of adolescent athletes (Mahoney et al., 2016). Having reviewed this study, reflected on the recommendations made and in considering how its methodology could be applied to an educational context, it was decided to investigate the potential impact of a similar intervention delivered to teachers, in the form of the ASIP, on student and teacher outcomes.

Before and after the implementation of the intervention, teachers' perceptions of AS along with their students' perceptions of AS and MT were measured using appropriate tools. The data collected was compared against an appropriate control group. In using such a design, it was hoped that the potential impact of increased AS

from teachers, through participation in the ASIP, on students' perceptions of the AS provided by their teacher and their perceptions of MT could be evaluated. This would allow for conclusions to be made on the effectiveness of an ASIP in impacting on students' perceptions of AS and its effectiveness in impacting on students' perceptions of MT in an educational context. This was presented in the form of three research questions.

The first research question asked; what impact does a teacher delivered ASIP have on teachers' perceptions of the AS they provide their students?. Considering that the intervention group teachers would be in direct receipt of the ASIP intervention, it was felt that this was an appropriate first question to address. While acknowledging that the sample size of teachers would be small, it was felt that findings related to this research question could potentially provide some evidence as to the impact of the intervention.

The second research question asked; what impact does a teacher delivered ASIP have on students' perceptions of the AS their teacher provides?. As the overall aim of an ASIP is to enhance a teacher's capacity to provide AS for students, the answering of this question would provide evidence from the students as to the impact of the intervention. As it can be a difficult task for a professional to self-evaluate an aspect of their practice, this information would be important in further assessing the impact of the ASIP (Perlman, 2011).

With both the first and second research question having addressed the potential impact of the ASIP on teachers' and students' perceptions of AS, the remaining research question focused on the potential impact of the ASIP on students' perceptions of their MT. A positive relationship was hypothesised between MT and students' perceptions of AS where increases in perceptions of the AS their teacher provides, because of teacher participation in the ASIP, would positively correlate with increases in perceptions of their MT.

4.2.3. Epistemological and theoretical perspective. The research paradigm used for this study was pragmatic in nature. The use of a pragmatic paradigm is common in practice-based research in psychology and featured in a number of the papers reviewed that employed a similar research design (How et al., 2013; Patall et al., 2016). This paradigm allows for methods of research to be used that are most appropriate for studying the topics under investigation. In this way, a combination of

methods can be employed that may shed light on the actual behaviour of the participants, some of the reasons behind those behaviours and the consequences that may follow from the behaviours (Haslam & McGarty, 2014).

The assumptions of a non-singular reality ontology, where all individuals can have their own unique interpretations of real-life experience, and value-laden axiology, where a goal of the research conducted is to benefit people, resulted in the choice of this paradigm (Howitt & Cramer, 2014). For the present study, the paradigm aligned with the focus of investigation on examining the impact of a teacher delivered ASIP on teachers' and students' perceptions of AS along with students' perceptions of their MT using primarily quantitative methods. It also allowed for qualitative data to be collected from the teacher participants to explore their experiences of participation in the ASIP. At all times, the emphasis was placed on findings being interpreted considering their usefulness and practical application for a range of stakeholders.

In deciding on this paradigm, other available alternatives were considered. Several paradigms related to psychological research had been introduced during the taught research components of this professional training programme. A positivist paradigm was initially considered as appropriate given its use in studies employing experimental and quasi-experimental methodologies and the focus it places on the gathering and analysis of data using quantitative methods (Haslam & McGarty, 2014). However, the positivist assumption that social science inquiry can uncover the 'truth' about real-world action, behaviour and practice raised an element of caution in using this paradigm.

Recognising its application to action-based research, the constructivist paradigm was also considered. This paradigm would have supported the use of methods to understand the subjective world of the participants and how multiple realities may exist which are socially constructed (Howitt & Cramer, 2014). While data was gathered from teachers through reflective activities in gaining insights into their experiences of the ASIP, it was decided from an early stage of the research development that quantitative methods would primarily be used. As a result, the use of a constructivist paradigm was not deemed most appropriate.

4.3. Critical Appraisal

4.3.1. Strengths and limitations of the research.

4.3.1.1. Research design. In line with the research paradigm, the use of experimental design for the research strengthens the overall quality of the study. The inclusion of a control group was a key design feature in allowing for a valid comparison to be made and for the results to be interpreted as they were. It also increased the study's validity. Employing a control group was a decision made early in the research process and was based on the use of control groups across previous similar studies where an ASIP was delivered to teacher participants (Cheon & Reeve, 2015; Cheon et al., 2018).

Discussions were held during supervision regarding the type of control group to be used. A waitlist control group was chosen for two main reasons. Firstly, it allowed for a valid comparison to be made with the active intervention group in determining what effects the ASIP had (Steinert, Stadter, Stark, & Leichsenring, 2017). Secondly, it allowed for those participants in the waitlist control group to participate in the intervention after the study had been completed (Steinert et al., 2017). This was mentioned by teachers in the waitlist control group during data collection where they inquired about the intervention, what it would involve and if they would have an opportunity to participate. On reflection, this may demonstrate a desire from teachers to engage in interventions that have a direct impact on their practice and supports the use of waitlist control groups in teacher-based experimental research.

The collection of qualitative data from the reflective questionnaires completed by the teachers can also be considered a strength of the study. While the study was primarily quantitative in nature, this design aspect provided compensation for the weaknesses of quantitative data collection alone and strengthened the results and conclusions drawn (Reeve & Cheon, 2016). This data identified aspects of the ASIP that teachers found beneficial and provided information on what possible improvements could be made. The teachers were also able to articulate their views on observed changes in their students over the course of the study. While the methods used were mainly quantitative in nature, it is apparent that the inclusion of this qualitative aspect served to supplement the conclusions drawn from the analysis conducted (Reeve & Cheon, 2016).

If the research design were to be altered for similar future projects, two aspects could be considered. On one level, the use of a longitudinal cohort design could be employed. This has been used in some studies reviewed and would support a potential maintenance effect and the greater generalisability of findings (Yu, Li, & Zhang, 2015).

In addition, introducing data collection at a third time point may prove beneficial. In past research, this has been a feature mid-way through a study and may provide for a richer picture in terms of data analysis and the interpretation of results (Cheon & Reeve, 2015). This design feature may also impact on how the latter stages of the ASIP are delivered where, for example, certain autonomy-supportive instructional behaviours are revisited. It is appropriate to note that the inclusion of additional data collection points featured in studies of greater duration.

    4.3.1.2. Measures. The measures used as part of this study are considered innovative with regards to the variables in focus. In measuring student perceptions of MT, this is the first known piece of research to use one of the most up-to-date measures, the MTQPlus, on a sample of this age. However, along with some of the reliabilities of this scale being lower than desired, other limitations related to its use also exist and warrant the need for future research in examining how a youth version can be further adapted and developed (Strycharczyk, Perry, & Clough, submitted). In this manner, the consideration of context and other relevant factors when using a measure originally developed with adults on a sample of young students is of importance. The past development of other related scales, notably the Mental Toughness Scale for Adolescents (MTS-A), indicates that a youth scale should include items that are relatively short, developmentally appropriate for the targeted sample, address relatable concerns and be relevant both within and outside an educational context (McGeown, St Clair-Thompson & Putwain, 2018).

    In addition, developmental research regarding the development of scales for children, and the adaptation of adult measures, highlights another main concern in ensuring that the modified items are appropriate in terms of the language used. In this regard, an emphasis should be placed on the ability of young people to comprehend the terminology and concepts that are in focus (Hall, 2009). As a result, it is necessary to consider the cognitive stage of the intended sample so that the most appropriate format and language can be utilised. Consideration should also be given to those in the group whose abilities may be above or below this level of cognitive development and suitable accommodations that can be made (Hall, 2009). As completed in other studies, any future use of the MTQPlus, could first ensure that the measure is fully validated with young people. Focus groups could be employed as one suitable approach where students are shown all questionnaire items to assess whether wording is understandable,

appropriate and aligned with the constructs of interest (McGeown, St Clair-Thompson & Putwain, 2018). Such a process may result in necessary revisions to the questionnaire items.

The development of an adapted version of the LCQ can also be regarded as a strength of this study. Modifying the existing LCQ, to ensure its better alignment with each aspect of self-determination theory (SDT), acknowledges that an autonomy-supportive teaching style is one that supports the basic psychological needs of autonomy, competence and relatedness through the optimisation of certain behaviours (Kusurkar et al., 2011; Reeve & Halusic, 2009). Furthermore, the use of this adapted measure with a group of teachers and a large cohort of students has contributed to the development and validation of a broader LCQ tool that may have potential use in future research.

4.3.1.3. Intervention. The ASIP featured several methodological strengths. In using the existing evidence-base, the design and delivery of the intervention was modelled off ASIPs that have been used previously. Key features of note included the delivery of the intervention in a multiple workshop format and a focus on certain autonomy-supportive instructional behaviours (Cheon et al., 2018). In addition, the effort given to address some of the limitations which have arisen when ASIPs have been used previously also strengthens the overall quality of this research. While only featuring in some previous studies, the inclusion of group discussion and reflective exercises during each workshop can potentially encourage increased engagement and facilitate collaborative learning amongst the teacher participants (Su & Reeve, 2011). Furthermore, the provision of on-going support via email over the course of the intervention can be considered innovative. While careful not to overload teachers with materials, this practice was added in recognising the value of on-going support being available for participants over the course of an intervention period (Jacob et al., 2017).

While strengths are evident, other relevant factors exist when reflecting on the effectiveness of the ASIP. The completion of the study relied on teachers giving up one hour of their school day and one hour of their after-school time for each workshop of the ASIP. As a result, the intervention was delivered over a total of six contact hours. While it may prove beneficial for this duration to be extended for future studies in seeing if other changes are evident, it is also appropriate to consider certain barriers which may exist when undertaking educational-based research. This is particularly

relevant for projects, such as the present study, where the delivery of a training programme to teachers was a key methodological feature.

In this manner, it is appropriate to consider the concepts of first-order change and second-order change and how they may apply to the Irish context. It can be argued that much of the CPD training which Irish teachers are offered over the course of a school year come under the category of first-order change. The philosophy of this approach is that the transfer of evidence-based knowledge over a period of instructional time can impact positively on an aspect of a teacher's classroom practice (Loewenberg Ball, Thames, & Phelps, 2008). The activities involved in these training programmes are often tangible and involve the transfer of verbal information from the facilitator to the training recipients. While such trainings have value and are practical, their impact as to what teachers gain and what they incorporate into future classroom practice remains a point of discussion (Loewenberg Ball et al., 2008)

In contrast, the delivery of training that is rooted in second-order change may be less familiar to teachers in the Irish context and can be considered more relevant to the implementation of an ASIP. At its core, an ASIP aims to alter the motivational style of a teacher in supporting them to meet the basic psychological needs of their students (Reeve, 2006). This would appear to align with principles of second-order change where the aim of intervention is to move a person from one state to another in supporting them to not only act but to think differently about their practice which may have more lasting effects (Waters et al., 2003). As is evident in characteristics of the ASIP used, the use of empowerment, modelling, the challenging of existing beliefs and reflection is intended to facilitate change. The possible lack of familiarity of teachers in the intervention group with such an approach may have limited the true impact of the intervention in the case of the present study.

4.3.1.4. Extraneous variables. Outside of administering the questionnaires to the teachers and students, the informal discussions that took place in each of the classrooms provided opportunities for thought and reflection. On several occasions, they served to highlight the potential impact of extraneous variables on the development of MT. Raised by students and their teachers, and considering the origin of MT as a prominent construct in the sporting domain, a young person's involvement in sport was mentioned as a possible mediating factor. Supported by the literature, points were made indicating that involvement in sport and competitive activity may serve to expose a

person to environments and conditions that target aspects of MT as set out in the 4C's model. These could include risk orientation, goal orientation, life control and confidence in abilities (Hunt et al., 2020). As the students who participated in this study were asked an open-ended question related to their hobbies and interests as part of data collection, information of this type is available and could be integrated into a subsequent study in the future.

As mentioned by teachers and school principals, the role of parents and the influence of the home environment on a young person's MT was also interesting to reflect on. Considering the significance of these variables in a child's life, it was reassuring to find related published studies which interested school staff could be informed about. Researchers have specifically examined the effect of strength-based parenting which is defined as a parent's intention to deliberately identify and cultivate positive beliefs, perceptions and qualities in their children through their ongoing interactions (Sagkal & Özdemir, 2019; Sağkal, 2019). The findings provide evidence for the indirect effects of strength-based parenting via MT on several child-related variables including their experiences of psychological distress, their subjective happiness and their levels of school engagement (Sagkal & Özdemir, 2019; Sağkal, 2019).

Research also exists examining the role of parents in the development of a child's overall sense of autonomy which may have implications for their perceptions of the AS provided by their teacher in school (Belsky et al., 2008). Especially during the early formative years of a child's life, it has been found that the support for autonomy provided by mothers and fathers in the course of parent-child interactions can impact positively on a child's transition to formal education, their ability to socially adjust and their early experiences of academic achievement (Belsky et al., 2008). In this regard, those children who are exposed to these types of interactions with their caregiver may be better able to identify autonomy support from their teacher.

4.3.1.5. Other design aspects. Throughout this research project, strategies were employed to increase the reliability of the research data. A research diary was used which contained reflections and observations to minimise research bias. It also became a very helpful resource when writing each chapter of this thesis. The primary researcher engaged in regular supervision with research supervisors. Key milestones of supervision included finalising the research design, systematically modifying the ASIP

intervention and planning for data collection and analysis. Amendments were made following supervisory feedback during each stage of the process. As has been mentioned, at three time points over the course of the project, progress was presented at a research review panel. At these panels, academics independent of the study reflected on the project and provided feedback which allowed for alternative perspectives and ideas to be accounted for which added to the quality of the study.

4.3.2. Ethical considerations. Before commencement of the study, ethical approval was sought and obtained from Mary Immaculate College's Research Ethics Committee (MIREC) and the ethics steering group of the educational/school psychology service in Ireland; the National Educational Psychological Service (NEPS). Resulting from this process, two main ethical issues were raised that required consideration and needed to be addressed before proceeding with the study.

4.3.2.1. Written Consent and Optimising Understanding. The gaining of consent from all participants was an aspect of the research process that required careful consideration, and this was reflected in both ethics' applications. Considering that the student participants were under the age of eighteen, it was necessary to obtain informed consent from parent(s)/guardian(s) and informed assent from the students themselves. This resulted in the drafting of different information letters and consent forms for each group which outlined what the study was investigating, what participation in the study would involve and any associated risks. The drafting of the information sheet and assent form for the students was a challenge as it required the use of child-friendly language that could be interpreted and understood by the students. Feedback gathered from the pilot study was of importance here as it provided an insight into how best to present this information.

4.3.2.2. Data Sharing. The nature of the data collected from the measures employed generated a second ethical issue where the information-sharing process between the primary researcher, the teachers and the parent(s)/guardian(s) of the students needed to be considered. In this regard, how communication takes place and how information is shared between such parties can pose ethical considerations (Attard, Mercieca, & Mercieca, 2016). Before commencing the study, it was necessary to clarify how any information of a sensitive nature would be shared. This resulted in specific wording being included in the information sheet for students in making them aware of the process that would be followed if concerns arose from any of their responses. In

truth, engaging in this process of ethical decision-making regarding the sharing of sensitive information was something that I had not previously considered and will be of benefit for me in future research work.

4.4. Implications of the Research

4.4.1. Knowledge and understanding of the topics. This study has shed further light on the relationship between SDT and MT which had previously only been examined in one other known study carried out in the sporting domain (Mahoney et al., 2016). Conducted in an educational context, the study investigated the role of AS from teachers in influencing the MT of students. The study was guided by a core theoretical perspective of SDT which proposes that the optimisation of any aspect of human functioning, in this case the elements that contribute to MT, is mediated by the degree to which a person perceives the fulfilment of three basic psychological needs; autonomy, competence and relatedness (Mahoney et al., 2014). In this manner, a core feature of the study was the delivery of an intervention to teachers focused on evidence-based ways to create an autonomy-supportive environment and to develop an autonomy-supportive teaching style.

The findings presented in the empirical paper did not indicate any changes in students' perceptions of their MT following teacher participation in the ASIP. While such findings did not support the effectiveness of the intervention in impacting on the development of student MT, it is appropriate that the understanding gained is considered alongside certain limitations of the study. Considering that a lack of significant change is based on the study's use of a short-term intervention delivered within a limited timeframe of ten weeks may serve to further highlight MT as a personality trait requiring more long-term intervention in pursuit of greater effects.

In recognising the influence of extraneous variables on a person's MT over the course of their lifetime, longitudinal research may appear a more appropriate research design to employ. The use of such design in a sporting context with athletes preparing for Olympic games in four-year cycles for example, may guide such studies in an educational context (Powell & Myers, 2017). The stages of development relevant for a young person, such as childhood and adolescence, or their stage of education, like primary and secondary, could be incorporated into more longitudinal research design.

In this manner, data collection may be better able to identify changes in students' perceptions of MT and any potential response to intervention over a longer period.

The findings related to changes in students' perceptions of AS following teacher participation in the ASIP add a new perspective to the existing knowledge base. From the perspective of the researcher, observing from first attempts at data analysis that students' perceptions of AS decreased following delivery of the ASIP generated feelings of deflation and disappointment. An initial reaction of "I've made things worse" was evident. However, in continuing with the analysis and in comparing the perceptions of students in the intervention group with those of students in the control group yielded interesting interpretations. The significantly slower rate of decline in perceptions of AS for female students and students attending school in a rural school setting in the intervention group is of interest. When compared to students in the control group, such a finding may indicate the potential of an ASIP to be used in a preventative way to maintain students' perceptions of AS and reduce possible decline.

These kinds of findings and interpretations have not been reported previously. In similar studies examining the impact of an ASIP on student outcomes, students' perceptions of AS were consistently found to have increased following teacher participation in the intervention (Cheon et al., 2014; Jang et al., 2016). As a result, the conclusions drawn from the study completed may serve to highlight different potential impacts of an intervention. It may emphasise that observing significant increases on a variable following a period of intervention may not be the only sign of a positive impact (Williams & Kemper, 2010). In accounting for the use of a control group as part of this research, reducing potential rates of decline in perceptions of a variable, like AS, can also be of value and importance.

4.4.2. Key messages for Psychologists. As has been documented, student wellbeing is a priority of educators and other allied professionals working in education. In Ireland, processes such as school self-evaluation encourage schools to promote, monitor and report on the wellbeing of their students while curriculum changes have also been introduced (DES, 2020). In this regard, evidence-based methods of promoting wellbeing are continuously developing. Considering their supportive and consultative role in school systems, psychologists can influence what knowledge and information teachers and school staff are aware of (Cline et al., 2015).

In line with this research project, informing teachers about SDT, its components and related interventions may be a possible task for psychologists to undertake. By communicating evidence-based information on the application of ASIPs and autonomy-supportive instructional behaviours, psychologists could support teachers in further meeting the basic psychological needs of students (Reeve, 2006). At the level of initial teacher education (ITE), psychologists who work in these settings may be in a position to educate emerging teachers as to the value of applying SDT principles in practice which may have a significant and lasting influence on their professional development (Tessier, Sarrazin, & Ntoumanis, 2010).

The outcomes arising from this research may also serve to highlight that awareness of psychological constructs that impact on a student's wellbeing, especially their ability to thrive and succeed, may form part of the knowledge base that psychologists share with teachers during the course of their work (St Clair-Thompson et al., 2015). MT may be one such construct which could potentially be used as a way of explaining and promoting an understanding of psychological wellbeing amongst young people. In particular, the way the construct is explained using the 4C's model may support the relevance of each scale and subscale to everyday life and aid its understanding as a construct of practical value (McGeown et al., 2017).

In addition, considering the emphasis which exists within education systems on assessment and the screening of students for potential issues, the use of a MT measure, such as the MTQPlus, may provide valuable insight for teachers and school staff as to the wellbeing of students (Hampton, Whitney, & Schwartz, 2002). When one considers the many assessment tools in use by schools and psychologists that relate to variables like literacy attainments, numeracy skills and adaptive behaviour, the need for a valid and reliable measure which addresses psychological wellbeing and mental health, and can be easily used, would appear evident. This may be especially relevant at times of educational transition when students can be at greater risk of issues, such as anxiety and stress, adversely affecting their progress (St Clair-Thompson et al., 2017)

4.4.3. The future of Mental Toughness research in education. In line with the main findings of the systematic literature review presented in chapter two, MT does appear to have value within education. The opinions and input of teachers who participated in the study confirm this view. In this regard, as well as longitudinal pieces of research focused on MT development over a longer period, a study more qualitative

in nature, looking at the perceptions and perspectives of Irish teachers and students on MT, could produce interesting findings (Anthony et al., 2016). During the data collection phases of the study, both students and teachers expressed an interest and curiosity in the construct. A question posed by several students was "what does MT mean?". They were also curious to understand what makes a person have MT and what could they do to improve it. In this regard, case-study research may be able to provide a more in-depth insight into individual perceptions of MT from the perspective of students and teachers.

In addition, as with other psychological constructs, longitudinal work looking at MT may be of benefit where a cohort design is employed. In line with large scale Irish studies such as those emerging from Growing Up in Ireland data (Sunday & Kabir, 2019; Williams, Murray, & Whelan, 2014), MT could be investigated at different stages of a young person's development. Such a study may highlight certain periods of development where intervention may be most effective. For example, the period of transition to adolescence for a young person can be a time of significant difficulty and strain (Forbes, Fitzpatrick, Magson, & Rapee, 2019; van den Akker, Deković, & Prinzie, 2010). As a result, investigating perceptions of MT and different responses to intervention during this stage may provide greater insight as to how young people respond to challenging situations and what resources they rely on for support.

4.4.4. The future of Self-Determination Theory research in education. From a topical perspective, the recent Covid-19 world health pandemic impacted on all aspects of society. The implications it had on the functions of daily living were evident and its effect on the education system was of interest to this researcher. In the Irish context, it resulted in a long period where students at all levels of education were faced with significant challenges as to how they would cope and manage. Through experience and from the accounts of students across media platforms, the focus that exists in our systems of education on structured, teacher-led, classroom-delivered instruction was evident. Moreover, the sudden withdrawal of this methodology overnight, coupled with the need for suitable alternative methods to be provided, impacted on students in different ways. In creating anxiety for many, straining motivation for some and making others question prospects, it will be interesting to observe the nature of research that will undoubtedly emerge connected to this period.

The learning that can be taken from this period may highlight the future of research related to SDT in the context of education. It may serve to emphasise what can be done in supporting students to have a greater sense of autonomy over their learning and their academic lives. As is often referenced, a primary goal of any education system can be the fostering of students who are autonomous and not anonymous (Reeve et al., 2004). In this manner, future research could continue to examine what can be done to increase a student's involvement in their education and develop their sense of being independent, responsible, and capable. In turn, this self-reliance and self-determination may be of support especially during a time of crisis, change or uncertainty. As featured in this research, the use of ASIPs with teachers can add to the existing research base on their effectiveness and indicate how students benefit from AS (Reeve, 2006). The use of such an intervention with teachers in a post-primary setting may be one specific idea to consider.

4.4.5. Dissemination of findings. Preliminary findings of this research study were presented at the Psychological Society of Ireland's annual conference (2019) and the National Educational Psychological Service's annual business meeting (2019). It is also intended that the findings from this research will be presented to two trainee educational and child psychologist cohorts at Mary Immaculate College along with the staff of the Doctorate in Educational and Child Psychology programme before the end of 2019/2020 academic year. The empirical paper, as presented in chapter three of this thesis, will be submitted for publication to an appropriate journal. Based on the published studies reviewed as part of this research project, 'Contemporary Educational Psychology', 'Irish Educational Studies' and 'The Journal of Educational Psychology' may be appropriate journals to consider. Presenting the research at relevant conferences scheduled for late 2020 and 2021 is also being considered as a way of further disseminating findings. Suitable conferences may include that of 'the Educational Studies Association of Ireland' and the 'International Conference on Engaging Pedagogy' at the University of Limerick.

4.5. Distinct Contribution

4.5.1. The application of Mental Toughness. There are aspects of this research project which indicate the value of MT as a psychological construct within education. Firstly, the outcomes of the literature review paper demonstrate positive associations

between a student's perception of their MT and several important variables. These include experiences of depression, stress, attainments in school and the development of adaptive inter-personal relationships (Gerber, Brand, et al., 2013; Mutz, Clough, & Papageorgiou, 2017). Secondly, this research project has shed further light on a psychological construct that can have practical value for schools. Its use in supporting the understanding and self-awareness students have of their psychological wellbeing and mental health is evident. In addition, when measured using an appropriate tool, such as the MTQPlus, it may yield valuable insights as to a student's overall wellbeing. Finally, while no significant changes in perceptions of MT were evident following the implementation of the ASIP, one possible intervention aimed at developing student MT has been explored and could be further developed and implemented based on the recommendations discussed.

4.5.2. The potential impact of Self-Determination Theory informed intervention. As has been discussed, the potential of using SDT in an applied way with teachers and other professionals in education is evident and is consistent with existing peer-reviewed studies (Leptokaridou, Vlachopoulos, & Papaioannou, 2016; Reeve, 2009; Reeve & Jang, 2006). The level of engagement from teachers who participated in the study reflects their understanding and belief that students have a greater chance of success and achievement when their psychological needs are met. The results of this research add evidence as to the effectiveness of ASIPs and subsequent impacts on student outcomes. In this manner, the findings of the study could assist teachers and those involved in teacher education in understanding the use of SDT in practice (Tessier et al., 2010). It also provides insight as to the challenges faced when implementing such an intervention programme. In this regard, the importance of placing focus on not only 'what to do' but 'how to do it' along with challenging existing beliefs when supporting teachers to develop an aspect of their practice is evident (Waters et al., 2003).

4.6. Personal Reflection

This personal reflection accounts for the entire research process and is guided by stages of Gibb's reflective cycle (Markkanen et al., 2020; Potter, 2015). This model gives structure to the learning and sense that can be gained from an experience. While often applied to repeated experiences, the stages can equally apply to a single experience which in this case is the completion of the research project.

4.6.1. Description. On commencing this professional doctorate in educational and child psychology, it was highlighted that the completion of a research project at 'doctoral-level' was a core component of the programme. A detailed timeline was provided which outlined each stage of the process over the duration of the programme and what would be required. This guided the research work completed during each year in ensuring that progress was made. Following this schedule, working independently, and liaising regularly with research supervisors, resulted in the completion of each component.

4.6.2. Feelings. Personally, commencing work on a doctoral level research project was a daunting experience considering that my experience of research was at an undergraduate level. Considering each element of this professional training programme, I felt that the research aspect would cause me the most challenge, an aspect of professional doctorates that can often pose a difficulty (Rudman, 2013). This initial concern was realised on several occasions especially at the later stages where the analysis of collected data and the completion of each chapter was required. Even though I had chosen a research area of interest, I always found the work to be more difficult than expected. This resulted in great amounts of perseverance and persistence being drawn upon. Reflecting now as I near completion, I feel satisfied with the research work I have completed. I also feel proud of what I have been able to overcome during the entire process.

4.6.3. Evaluation. In evaluating the overall process of completing a research project, positive and negative aspects come to mind. On one level, the support provided by both research supervisors was an invaluable aspect. When supervision meetings were held, the discussions were productive and enabled the research idea to be progressed. This was evident from the summary of each meeting contained in the research supervisory record where clear progression could be seen. In contrast, managing the workload arising from the project alongside the demands of the professional placements, the taught modules and life itself proved difficult. While time was made available for the completion of research work, it never seemed enough when considering the perceived standard of work required. Personally, this resulted in a lot of time during evenings, weekends and holiday periods being given to research. In truth, my time management skills could be reflected on where perhaps I could have been more

self-disciplined. However, I do feel that the research component was the most difficult aspect of this programme for me.

4.6.4. Action plan. In reflecting on what has been discussed and in accounting for the entire project, several conclusions can be drawn where learning can be taken for the future. If tasked with undertaking a research project in the future, I would endeavour to improve on my time management skills. While I did trial their use at several times during the programme, the use of Gantt charts may prove beneficial. As a time-management tool, input on its effective use could be given to future cohorts of students as a way of learning from past experiences. I also feel that engaging in research projects will feature in my future professional work as a psychologist. In this manner, I hope that the research skills and knowledge which I have gained during the programme will be of benefit for me.

4.7. Conclusions

In taking an initial research idea and completing a study which, I believe, makes an original contribution to the research base, has been a difficult but beneficial process. In accepting that it is an integral part of the professional qualification which I have been pursuing for the past three years, I ensured that I chose an area of study which would interest me and drive my motivation to complete the project. The psychological constructs of MT and AS, which have been discussed and examined throughout this thesis, can be seen to impact outcomes related to young people and their wellbeing especially.

The study conducted which investigated how both constructs may be connected is the first of its kind in an educational context. The study's findings have provided insights on each construct and their practical value while also indicating possible areas for future research to be completed. On a final personal note, the knowledge and understanding I have acquired on both these constructs is already impacting on my professional practice and will undoubtedly continue to do so in the future.

4.8. Impact Statement

Action research by its nature is intended to inform practice within the context it is conducted. Action research related to the psychology of education is of importance as it can support professionals in developing their practice which may have positive effects for students (Spangler, 2003). In this regard, this research has produced results of a high quality which add to the existing research base. Gaining new insights on constructs like the MT of students, their perceptions of the AS provided by teachers and the possible relationships between them can serve to impact on a range of domains.

At the level of ITE, research outcomes may indicate the potential benefit of educating emerging teachers on psychological theories and constructs that impact on practice. Relevant to this thesis, the role of SDT and how it relates to the motivational dynamics that exist in classrooms is evident (Tessier et al., 2010). How the principles of this theory can be incorporated into effective teaching methodologies and communicated to teachers in training may have positive long-term effects on their professional development.

The potential impact of pedagogy linked to SDT is also relevant for teachers at all levels of education, a motivation of whom is the promotion of positive outcomes for students (Reeve, 2006). By engaging with SDT-informed interventions, like an ASIP, teachers are supported in understanding that students may be better able to succeed and progress in the education system and in life when their basic psychological needs of autonomy, competence and relatedness are met (Bozack, Vega, McCaslin, & Good, 2008; Gutiérrez et al., 2018).

These impacts have the potential to benefit students and their experiences at school. When those who engage with students have increased awareness, knowledge and understanding of their basic psychological needs along with evidence-based approaches for meeting these needs, favourable outcomes would appear to follow (Su & Reeve, 2011). This may also have consequences when students leave education and in predicting their overall psychological wellbeing as they transition to adulthood (Reeve, 2006).

Considering the growing emphasis placed on wellbeing, the insights and understandings gained on MT have the potential to impact on teachers, allied professionals, and wider school systems. MT has been shown to have positive

associations with variables such as experiences of stress and academic attainment (McGeown et al., 2016). The level of understanding that the 4C's model of MT provides along with the construct's potential for development has also been recognised (Crust & Clough, 2011). These insights may support the use of MT with young people in promoting their wellbeing and protecting their mental health. When applied and measured using a recognised tool, the potential use of MT in the assessment and screening of students may yield valuable information on aspects of their wellbeing which could inform future action.

In communicating these potential impacts, the empirical paper will be submitted for publication. Presenting the research at relevant conferences, with themes on teacher pedagogy and student wellbeing for example, may also prove an effective way of disseminating findings. The research was presented at the Psychological Society of Ireland's annual conference (2019) and the National Educational Psychological Service's annual business meeting (2019). Findings are also due to be presented at the 2020 International Research Methods Summer School taking place at Mary Immaculate College.

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Appendices

Appendix A

List of Excluded Studies with Exclusion Reason (Review Question 1)

Excluded Studies	Reason for Exclusion
Kamtsios, S., & Karagiannopoulou, E. (2013). Conceptualizing students' academic hardiness dimensions: a qualitative study. *European Journal of Psychology of Education, 28*(3), 807-823.	Criteria 3
Li, C., Zhang, Y., Randhawa, A. K., & Madigan, D. J. (2020). Emotional exhaustion and sleep problems in university students: Does mental toughness matter? *Personality and individual differences, 163*, 110046.	Criteria 2
Lin, Y., Clough, P. J., Welch, J., & Papageorgiou, K. A. (2017). Individual differences in mental toughness associate with academic performance and income. *Personality and Individual Differences, 113*, 178-183.	Criteria 2
Micoogullari, B. O., Odek, U., & Beyaz, O. (2017). Evaluation of Sport Mental Toughness and Psychological Wellbeing in Undergraduate Student Athletes. *Educational Research and Reviews, 12*(8), 483.	Criteria 2
St Clair-Thompson, H., Giles, R., McGeown, S. P., Putwain, D., Clough, P., & Perry, J. (2017). Mental toughness and transitions to high school and to undergraduate study. *Educational Psychology, 37*(7), 792-718.	Criteria 2
Stamp, E., Crust, L., Swann, C., Perry, J., Clough, P., & Marchant, D. (2015). Relationships between mental toughness and psychological wellbeing in undergraduate students. *Personality and Individual Differences, 75*, 170-174.	Criteria 2

Appendix B

Characteristics of Studies (Review Question 1)

			Bédard-Thom & Guay (2018)		
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To investigate if mental toughness can predict academic achievement and preference for difficult tasks in education.	515 high school students. Male and female. Mean age of 15.68 years.	Canada.	Correlational cross-sectional design.	Mental toughness was measured using the short version of the Mental Toughness Inventory (MTI). Academic achievement was measured using a cumulative score of students' grades according to school records. Preference for difficult tasks was measured using the School Failure Tolerance Scale (STF).	A mental toughness general factor predicts better school achievement and preference for difficult tasks.

Gerber et al. (2015)

Aim	Participants	Country	Design	Measures	Outcome(s)
To investigate if mentally tough students are more resilient to stress and depressive symptoms.	Sample 1: 284 high school students. 99 males, 185 females. Mean age of 18.3 years.	Switzerland (German-speaking parts).	Correlational cross-sectional design.	Mental Toughness was measured using the 48-item Mental Toughness Questionnaire (MTQ48). General perceived stress was measured using the 10-item perceived stress scale (PSS) (Cohen, 1983). The severity of depressive symptoms was measured using the Beck Depression Inventory (BDI) (Beck, 1961).	Mental toughness was found to mitigate the relationship between high stress and depressive symptoms. In addition, the interaction effect between stress and mental toughness explained 2% of the variance in the sample.

		Gerber et al. (2013)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To examine the association between mental toughness and stress resilience in second level students.	865 students from 2 vocational schools. 42.7% of the sample was female. The sample had a mean age of 17.86 years.	Switzerland (German-speaking part).	Longitudinal (10 month) correlational study.	Mental toughness was measured using the 18-item short form of the MTQ48. Perceived stress was measured subjectively using the Adolescent Stress Questionnaire (ASQ) (Byrne, 2007). Depressive symptoms were also measured using the CES-D along with life satisfaction using three items of the Satisfaction with Life Scale (Pavot & Diener, 2008).	Overall, results from the study show that mental toughness operates as a stress resilience resource for adolescents.

	McGeown, Putwain, St. Clair-Thompson, & Clough (2017)				
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To explore the concept of Mental Toughness from the perceptions of adolescents to better understand their views of the attributes involved (commitment, confidence challenge and control).	54 adolescent students from a single Scottish secondary school. Male ($n =23$) and female ($n = 31$). Age range of 12 to 17 years.	United Kingdom (Scotland).	Group design using focus groups.	The students' perceptions of Mental Toughness were attained using focus groups which were audio-recorded and transcribed verbatim. The collected data was analysed using principles of abbreviated grounded theory.	The findings were presented under 6 headings in line with two of the 4C's (commitment and challenge) and four of the subscales (emotional control, life control, interpersonal confidence, confidence in abilities) with key insights discussed. These included the influence of environmental factors and individual differences between students.

	McGeown, St. Clair-Thompson, & Putwain (2018)				
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To examine the validity of a newly developed MT instrument and to assess the correlations of MT attributes with academic motivation, academic engagement (sample 1), wellbeing and test anxiety (sample 2).	Sample 1: Students from a single Scottish secondary school (n = 439). Male (n = 216) and female (n = 223). Mean age of 14.3 years. Sample 2: Students from a single English middle school (n = 270). Male and female. Mean age of 12.1 years.	Sample 1: United Kingdom (Scotland) Sample 2: United Kingdom (England)	Group correlational design for both samples.	Sample 1: Mental Toughness was measured using the newly developed 18-item MTS-A. Academic engagement and motivation was measured using the 44-item academic engagement and motivation scale for high schools. Sample 2: As with sample 1, Mental Toughness was measured using the newly developed 18-item MTS-A. The Revised Anxiety and Depression scale (short version) was the wellbeing measure used. The Revised Anxiety Scale was used to assess test anxiety.	Sample 1: Higher MT scores were related to higher scores for adaptive thoughts (self-belief, value and learning focus). Higher MT scores were also related to adaptive behaviours and lower scores for certain non-adaptive behaviours. Sample 2: All six MT components measured were positively related to indicators of wellbeing (lower depression and generalised anxiety). Greater MT was also related to lower test anxiety.

		Papageorgiou et al. (2018)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To explore the degree to which individual differences in mental toughness and narcissism predict individual variation in school achievement.	339 students from three different Italian high schools. 54% of the sample was female. The mean age of the students who participated was 15.83 years.	United Kingdom.	Longitudinal, correlational study.	Mental toughness was measured using the newly developed 10-item mental toughness questionnaire (MTQ10). Subclinical narcissism was measured using the Short Dark Triad questionnaire (SD3). School grades were recorded by self-report measures. Cognitive ability was measured by assessing non-verbal reasoning using the Raven's Progressive Matrices Test (Raven, 1996).	Mental toughness correlated positively with narcissism and predicted a small percentage of the variation in school achievement. Relationship between narcissism and mental toughness could be one of the non-cognitive mechanisms that underlie individual variation in school achievement.

			Sağkal (2019)		
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To student the indirect effects (via Mental Toughness) of strength-based parenting on school outcomes for adolescents; school engagement and burnout.	350 high school students from a central school district of the city of Aydin in Turkey. 49.7% of the sample was female. The age range of the students who participated was 14 to 18 years.	Turkey.	Group-based correlational design.	Strength-based parenting was measured using the Strength-based parenting (SBP) scale, a 14-item self-report measure. Mental toughness was measured using the newly developed Mental Toughness Scale for Adolescents (MTS-A), an 18-item self-report measure. School engagement was measured using the 15-item Behavioural-Emotional-Cognitive School Engagement Scale (BEC-SES). Burnout was measured using the 9-item self-report School Burnout Inventory (SBI) which has been shown to have good psychometric properties.	Mental Toughness was shown to be a potential mediating mechanism in the link between strength-based parenting and the school outcomes investigated. A possible explanation for this is that the parental practice of cultivating strengths in children may develop aspects of MT which contributes to higher levels of school engagement and lower incidences of burnout in students.

			St Clair-Thompson et al. (2015)		
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To examine the relationship between mental toughness and different aspects of educational performance; attainment (study 1), attendance (study 1), classroom behaviour (study 2) and peer relationships (study 3).	Study 1: 159 second-level students. 89 males and 70 females. The mean age of the sample was 14 years and 5 months. Study 2: 295 second-level students. 142 males and 153 females. The mean age of the sample was 14 years and 8 months. Study 3: 93 second-level students. 50 males and 43 females. The mean age of the sample was 11 years and 5 months.	England, United Kingdom (in each of the individual studies).	Correlational Design (in each of the individual studies).	Mental toughness was measured using MTQ48 (Clough et al., 2002). The school provided information on students' grades and records of attendance. Classroom behaviour was measured using the Connor's Teacher Rating Scale. Peers relationships were measured using the Social Acceptance Scale from the Self-Perception Profile (Harter, 1985).	Study 1: Significant associations between control of life with attainment and attendance. Study 2: Significant associations between control of life with counter-productive classroom behaviour. Study 3: Significant associations between confidence in abilities and interpersonal confidence with peer relationships.

St Clair-Thompson et al. (2017)					
Aim	*Participants*	*Country*	*Design*	*Measures*	*Outcome(s)*
To examine the relationships between mental toughness and concerns about moving to high schools (an educational transition) amongst a sample of young students.	105 students from a middle school in the north-east of England who were about to undergo transition to high school. Male (n = 52) and female students (n = 53). The mean age of students was 13 years and 5 months and the age range of the students was 12 to 13 years.	England, United Kingdom.	Correlational Design.	Mental toughness was measured using the 48-item MTQ48 (Clough et al., 2002). Self-esteem was measured using the Rosenberg self-esteem scale, a widely used measure of this construct with evidenced psychometric properties. Pupils also completed The School Concerns Questionnaire which lists 17 major concerns about moving to a new school and students rate their level of concern on a 10-point scale.	There were statistically significant correlations between each sub-component of mental toughness, self-esteem and school concerns. Each subcomponent of MT was significantly related to school concerns. Regression analysis demonstrated that the confidence in abilities subscale of MT had most influence in supporting young students with the transition to high school.

Appendix C

Weight of Evidence Criteria (Review Question 1)

WOE-A: Quality of Methodology

As each of the studies reviewed employed correlational designs, the Thompson et al. (2005) coding protocol was used for WOE-A: Quality of Methodology. In addition, review specific judgements were made with relation to WOE-B and WOE-C based on the criteria described below.

Design

Weighting	Description
High (3)	A correlational design was used.
	The variables investigated included mental toughness along with academic attainment and overall wellbeing in secondary school.
	The study was conducted in a school setting.
Medium (2)	A correlational design was used.
	The variables investigated included mental toughness and a related aspect of academic attainment or overall wellbeing in secondary school.
	The study was conducted in a school setting.
Low (1)	A correlational design was used.
	The variables investigated included mental toughness and a related aspect of academic attainment or overall wellbeing in secondary school.
	The study was conducted outside of a school setting.

Measurement

Weighting	Description
High(3)	Mental Toughness was measured using the MTQ48.
	The other variables were measured using recognised standardised measures with measures of reliability and validity being reported.
Medium (2)	Mental Toughness was measured using a recognised variation of the MTQ48.

	The other variables were measured using recognised standardised measures with measures of reliability and validity being reported.
Low(1)	Mental Toughness was measured using a measure other than the MTQ48 or a recognised variation.
	The other variables were measured using self-report measures.

Fidelity

Weighting	Description
High (3)	The measurements were administered and recorded by a suitable professional (i.e. the study author) and ongoing supervision and support was made available.
Medium (2)	The measurements were administered and recorded by a suitable professional (i.e. the study author) but ongoing supervision and support was not made available.
Low (1)	The measurements were not administered and recorded by a suitable professional (i.e. the study author) and ongoing supervision and support was not made available.

WOE-A was calculated by firstly assigning a score to each weight subcategory: High = 3, Medium = 2, Low = 1. The mean score was determined from the total score of the subcategories (Design + Measurement + Fidelity $\div$ 3 = WOE-A). The final WOE-A score was levelled using the following thresholds: High = 2.6 to 3, Medium = 1.5 to 2.5, Low = 1.4 or below.

WOE-B: Methodological Relevance

Weighting	Description
High (3)	Direct associations between mental toughness and academic attainment and/or overall wellbeing in school are made supported by the appropriate statistical analysis.
Medium (2)	Less direct associations between mental toughness and academic attainment and/or overall wellbeing in school are made supported by the appropriate statistical analysis.
Low (1)	Weak associations between mental toughness and academic attainment and/or overall wellbeing in school are made that are not supported by the appropriate statistical analysis.

WOE-B was calculated by assigning a score to each weight sub-category: High = 3, Medium = 2, Low = 1.

WOE-C: Topic relevance

Weighting	Description
High (3)	Participants come from a diverse range of socio-economic backgrounds and gender differences are accounted for.
	The study provides a clear context and rationale on the construct of Mental Toughness with relevant theories and frameworks being referenced.
Medium (2)	Participants come from a diverse range of socio-economic backgrounds and gender differences are accounted for.
	The study provides a limited context and rationale on the construct of Mental Toughness with relevant theories and frameworks being referenced.
Low (1)	Participants come from a diverse range of socio-economic backgrounds, but gender differences are not accounted for.
	The study provides a weak context and rationale on the construct of Mental Toughness with relevant theories and frameworks being referenced.

WOE-C was calculated by assigning a score to each weight sub-category: High = 3, Medium = 2, Low = 1.

Overall Weight of Evidence (WOE-D)

WOE-D was calculated by firstly assigning a score to each weight subcategory: High = 3, Medium = 2, Low = 1. The mean score was determined from the total score of the subcategories (WOE-A + WOE-B + WOE-C ÷ 3 = WOE-D). The final WOE-D score was levelled using the following thresholds: High = 2.6 to 3, Medium = 1.5 to 2.5, Low = 1.4 or below.

Appendix D

List of Excluded Studies with Exclusion Reason (Review Question 2)

Excluded Studies	Reason for Exclusion
Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Pühse, U., Elliot, C., et al. (2012). Adolescents' exercise and physical activity are associated with mental toughness. *Mental Health and Physical Activity, 5*(1), 35-42.	Criteria 4
Li, C., Martindale, R., & Sun, Y. (2019). Relationships between talent development environments and mental toughness: The role of basic psychological need satisfaction. *Journal of Sports Sciences, 37*(18), 2057-2065.	Criteria 4
Mahoney, J., Ntoumanis, N., Mallett, C., & Gucciardi, D. (2014). The motivational antecedents of the development of mental toughness: a self-determination theory perspective. *International Review of Sport and Exercise Psychology, 7*(1), 184-197.	Criteria 5
Zalewska, A. M., Krzywosz-Rynkiewicz, B., Clough, P. J., & Dagnall, N. (2019). Mental toughness development through adolescence: Effects of age group and community size. *Social Behavior and Personality, 47*(1), 1-8.	Criteria 2

Appendix E

Characteristics of Studies Used (Review Question 2)

Anthony, Gordon, Gucciardi, & Dawson (2018)

Aim	Participants	Country	Design	Measures	Intervention	Outcome(s)
To evaluate the effectiveness of a coach-targeted education programme aimed at increasing the frequency of desirable mentally tough behaviours in elite athletes.	3 development coaches between 31 and 33 years of age, with 2 to 5 years elite coaching experience and 15 professional team sport athletes, with ages ranging from 18 to 23 years.	Australia.	Experimental design.	The coaches rated athletes on a bespoke 9-item Mentally Tough behaviours scale (MTbs) using a 7-point Likert scale. This scale was created following qualitative interviews with the coaches, support staff and athletes and aligned with the team's core values.	The GROW coaching model (Whitmore, 2002) formed the foundation of the programme. The main intention of the programme was to guide the behavioural coaching dialogue between the coach and their athletes. The programme was delivered over a 5-month period.	In response to the programme, MTbs scores were shown to increase through the first half of the programme at which they plateaued. The study authors also noted barriers to implementing the intervention. These included supporting the coaches to use the information alongside other demands.

			Bell, Hardy & Beattie (2013)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Intervention*	*Outcome(s)*
To evaluate the effectiveness of a mental toughness intervention delivered to a group of elite youth cricketers.	41 male cricketers who were all between the ages of 16 and 18.	The United Kingdom.	Experimental design. 20 of the participants received the intervention and the other 21 were placed in a control group.	The Mental Toughness Inventory, 8-items.	A Mental Toughness training programme was run over 46 consecutive days as part of a training camp. The main mode of intervention was to provide participants with opportunities to deal with situations involving pressure and threat.	The intervention group showed significant improvements in mental toughness when compared to the control group.

			Gucciardi, Gordon & Dimmock (2009)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Intervention*	*Outcome(s)*
To evaluate the effectiveness of two different psychological skills training packages in enhancing mental toughness.	76 males who were part of an under-15 Australian football team along with their coaches.	Australia.	Experimental design. Participants were equally divided between 2 intervention groups and a control group who did not receive any intervention.	Mental toughness was measured using the Australian football mental toughness inventory that measured the 4C factors of MT.	The first intervention was a psychological skills training intervention. The second was a mental toughness training intervention. Both interventions were delivered weekly for 6 weeks in the form of a 2-hour session.	Both programmes used had an equal effect in enhancing mental toughness using subjective ratings from the participants in a sporting context.

			Killy, Van Nieuwerburgh & Clough (2017)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Intervention*	*Outcome(s)*
To investigate whether combining positive psychology coaching and kickboxing would progress the development of mental toughness compared to kickboxing alone.	28 adults were recruited for the purposes of this study and were all members of a kickboxing club.	The United Kingdom.	Experimental design. Participants were divided equally between an intervention and a control group.	The MTQ48 was used to measure mental toughness. A 5-point Likert scale was used to respond to the 48 items.	The intervention involved a behaviour based coaching model, using the GROW framework, that was delivered to participants individually by a qualified practitioner.	Those participants in the intervention group showed a significant increase in certain factors of mental toughness. The specific factors were emotional control and confidence in abilities.

			Mahoney et al. (2016)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Intervention*	*Outcome(s)*
To investigate if autonomy-supportive coaching behaviour and mental toughness would increase following participation in a coach delivered autonomy-supportive intervention.	113 adolescent rowers and their coaches (n=18).	The United Kingdom.	Experimental deign. Participants were randomly assigned to the intervention group and a delayed treatment control group.	The mental toughness index was used to measure mental toughness. This consisted of 8-items. The sport climate questionnaire was used to measure autonomy-supportive coaching behaviours.	The intervention consisted of 2 workshops spaced two weeks apart delivered to the coaches. Each workshop lasted for 2 hours and focused on knowledge and skills related to autonomy support.	The study did not find any significant effects for the intervention. The rowers did not find the coaches more autonomy-supportive after participation in the intervention. Possible reasons for this and limitations of the study are discussed.

			Parkes & Mallet (2011)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Intervention*	*Outcome(s)*
Regarding optimism as an underlying mechanism of mental toughness, the study evaluated the effectiveness of an optimism intervention employing CBT techniques.	7 male rugby players were recruited. They were all aged between the ages of 20 and 24.	Australia.	A mixed model experimental design was used, employing quantitative and qualitative measures at the pre and post intervention stages.	Levels of optimism, as linked to mental toughness, were measured using the sport attributional style scale.	The intervention was an adapted version of an intervention used in a previous study and was titled 'The Optimistic Footballer'. It employed CBT methods such as identifying automatic thoughts and each participant engaged in eight thirty-minute sessions of intervention.	While the findings were not related directly to mental toughness, significant improvements in how the participants attributed setbacks to external factors as opposed to internal factors were found.

			Sheard & Golby (2006)			
Aim	*Participants*	*Country*	*Design*	*Measures*	*Intervention*	*Outcome(s)*
To examine the effects of a 7-week psychological skills training (PST) programme on competitive swimming performance and psychological development.	36 adolescent national level swimmers. Male (n = 13) and female (n = 23) participants. The mean age of participants was 13.9 years.	United Kingdom (England).	Experimental design.	Along with swimming performance, six psychological attributes were measured: mental toughness, hardiness, self-esteem, self-efficacy, dispositional optimism and positive affectivity. Mental toughness was measured using the 42-item Psychological Performance Inventory (PPI) which yields an overall MT score along with seven subscale scores.	The PST programme consisted of 5 sessions. These were delivered weekly and each lasted for 45 minutes. The sessions covered goal setting, visualisation, relaxation, concentration and thought stopping. Techniques and exercises for each of these skills were adapted from Goldberg (1998).	Overall, positive intervention effects were shown for Mental Toughness scores where most of the swimmers (28 out of 36) improved on their pre-intervention score. The swimmers were shown to display improved performance, coping skills and psychological development.

Appendix F

Weight of Evidence Criteria (Review Question 2)

WOE-A: Quality of Methodology

As each of the studies reviewed employed experimental design, the APA Task Force Coding Protocol by Kratochwill (2003) was used for WOE-A: Quality of Methodology. In addition, review specific judgements were made with relation to WOE-B and WOE-C based on the criteria described below.

Design

Weighting	Description
High (3)	An experimental design was used which included the use of control group.
	The dependent variable measured was mental toughness and the independent variable measured related to the intervention.
	The study was conducted over a fixed and clear time period.
Medium (2)	An experimental design was used which included the use of a control group.
	There was only one variable measured and that was the dependent variable of mental toughness.
	The study was conducted over a fixed and clear time period.
Low (1)	An experimental design was used. There was no control group.
	There was only one variable measured and that was the dependent variable of mental toughness.
	The time period over which the study was conducted was vague and unclear.

Measurement

Weighting	Description
High (3)	Mental Toughness was measured using the MTQ48.
	Other possible effects of the intervention were measured using recognised measures.
Medium (2)	Mental Toughness was measured using a recognised measure used previously in studies of similar nature.

Low (1)	Other possible effects of the intervention were measured using recognised measures.
	Mental Toughness was measured using a measure other than the MTQ48 or a recognised variation.
	Other possible effects of the intervention were not measured.

Fidelity

Weighting	Description
High (3)	The intervention was delivered by a suitable professional (i.e. the study author) and ongoing supervision and support was made available.
Medium (2)	The intervention was delivered by a suitable professional (i.e. the study author) but ongoing supervision and support was not made available.
Low (1)	The intervention was not delivered by a suitable professional (i.e. the study author) and ongoing supervision and support was not made available.

WOE-A was calculated by firstly assigning a score to each weight sub-category: High = 3, Medium = 2, Low = 1. The mean score was determined from the total score of the subcategories (Design + Measurement + Fidelity ÷ 3 = WOE-A). The final WOE-A score was levelled using the following thresholds: High = 2.6 to 3, Medium = 1.5 to 2.5, Low = 1.4 or below.

WOE-B: Methodological Relevance

Weighting	Description
High (3)	The impact of the intervention on measured levels of mental toughness was discussed and supported by the appropriate statistical analysis. Effect sizes also reported.
Medium (2)	The impact of the intervention on measured levels of mental toughness was discussed and supported by the appropriate statistical analysis. Effect sizes not reported.
Low (1)	The impact of the intervention on measured levels of mental toughness was not discussed or supported by the appropriate statistical analysis. Effect sizes not reported.

WOE-B was calculated by assigning a score to each weight sub-category: High = 3, Medium = 2, Low = 1.

WOE-C: Topic relevance

Weighting	Description
High (3)	The study provides a clear context on the topic of Mental Toughness with relevant theories and frameworks being referenced.
	The study presents a strong rationale as to why investigating potential means of developing mental toughness is of significance and value.
Medium (2)	The study provides a clear context on the topic of Mental Toughness with relevant theories and frameworks being referenced.
	The study presents an adequate rationale as to why investigating potential means of developing mental toughness is of significance and value.
Low (1)	The study provides a limited context on the topic of Mental Toughness with relevant theories and frameworks being referenced.
	The study presents a weak rationale as to why investigating potential means of developing mental toughness is of significance and value.

WOE-C was calculated by assigning a score to each weight sub-category: High = 3, Medium = 2, Low = 1.

Overall Weight of Evidence (WOE-D)

WOE-D was calculated by firstly assigning a score to each weight sub-category: High = 3, Medium = 2, Low = 1. The mean score was determined from the total score of the subcategories (WOE-A + WOE-B + WOE-C ÷ 3 = WOE-D). The final WOE-D score was levelled using the following thresholds: High = 2.6 to 3, Medium = 1.5 to 2.5, Low = 1.4 or below.

Appendix G

Letter/Email to School Principal

Name of School Principal

School Address

RE: Permission to Conduct a Research Study

Dear Principal,

I am writing to request permission to conduct a research study with some of the teachers and pupils at (name of school). I am currently a second-year student on the Professional Doctorate in Educational and Child Psychology programme at Mary Immaculate College (University of Limerick) and I am in the process of conducting my doctoral thesis. The study is entitled 'An investigation into the impact of a teacher-based autonomy-supportive intervention programme on students' perceptions of their mental toughness'.

I would like to recruit 5th and 6th class teachers in the school and their students to participate in the study. Prior to participation, interested teachers will be given an information sheet on what the study involves and a consent form to sign. The students will then be given an information sheet and consent form to be signed by their parent/guardian. The students who obtain parental/guardian permission will be given an assent form to complete. I have attached samples of these documents with this letter.

During the first part of this study, I will visit the teacher and their class. On this day, the students will be asked to fill in two questionnaires. One relates to their perceptions of their mental toughness and the other relates to how autonomy-supportive they perceive their teacher to be. The teachers will also complete a questionnaire related to how autonomy-supportive their teaching style is. This interaction will take roughly 30 minutes to complete. At this point, some of the teachers will be chosen at random to participate in an Autonomy-supportive Intervention Programme (ASIP). This will require attendance at a workshop that I will deliver on three occasions over a three-month period (one session per month). This can take place in your school at the end of

a school day that suits (perhaps during Croke Park time should this apply to your school). At the end of the three-month period, I will again visit the teacher and their class where they will complete the same measures completed at the beginning of the study. Individual results of this study will remain confidential and anonymous. Should this study be published and presented at conferences, only overall results will be documented. No costs will be incurred by either your school or the individual participants.

Your approval to conduct this study would be greatly appreciated. I can follow up with a telephone call next week and would be happy to answer any questions or concerns that you may have at that time. You may also contact me at my email address at any time: xxxxxx.

If you agree, I will ask you to kindly submit a signed letter of permission on your school's letterhead acknowledging your consent and permission for me to conduct this study at your institution.

Sincerely,

Eoin Harte.

Appendix H

Teacher Information Sheet

'An investigation into the impact of a teacher-based autonomy-supportive intervention programme on students' perceptions of their mental toughness'

Teacher Information Letter

What is the project about?
Mental toughness is regarded as a collection of behaviours, attitudes and emotions that can allow an individual to persevere and successfully overcome obstacles and periods of pressure. The current study is looking at the potential influence that teachers can have in developing mental toughness in their students through autonomy-supportive practices in their teaching.

Who is undertaking it?
My name is Eoin Harte and I am a Postgraduate student attending Mary Immaculate College. I am presently completing a Professional Doctorate in Educational and Child Psychology in the Department of Educational Psychology, Inclusive and Special Education. The current study will form part of my thesis and is under the supervision of Dr Therese Brophy and Dr John Perry.

Why is it being undertaken?
The aim of the study is to investigate whether levels of mental toughness in primary school students can be developed through increased autonomy-supportive practices by their class teacher.

What are the benefits of this research?
It is hoped that the data gathered from participants (a) will develop our understanding of mental toughness as an important psychological construct for young people (b) may provide evidence as to one way in which the development of a students' mental toughness can be supported (c) may have implications for initial teacher training programmes along with continuing professional development programmes for practicing teachers.

Exactly what is involved for the participant (time, location, etc.)
The reading of this information letter and completion of the attached informed consent form is the first step. After this, I will arrange to visit you and your class where you and your students will be invited to complete some questionnaires. From here, you will be assigned to an intervention group or the waitlist control group. If you are assigned to the intervention group, you will be invited to attend an autonomy-supportive intervention programme (ASIP) that I can run at your school. This involves attendance at a workshop on three occasions over the course of three months.

You will also be asked to provide an email address that will be used during the study so that I can provide you with resources and materials related to autonomy support on a regular basis. At the end of the three-month period I will visit you and your class again to complete the same questionnaires as completed at the beginning. If you are assigned to the waitlist control group, you will be invited to attend the ASIP after the study has been completed.

Right to withdraw
Your anonymity is assured, and you are free to withdraw from the study at any time without giving a reason and without consequence.

How will the information be used / disseminated?
The data gathered from your responses will be combined with that of the other participants in this study and used to form the results section of my thesis. Summary data only will appear in the thesis, individual participant data will not be shown. Outside the scope of the research project, the data will only be used for presenting findings at relevant conferences and in the process of publishing the study.

How will confidentiality be kept?
All information gathered will remain confidential and will not be released to any third party. A random ID number will be generated for each participant and it is this number rather than the participant's name which will be held with their data to maintain their anonymity.

What will happen to the data after research has been completed?
In accordance with the MIC Record Retention Schedule, all research data will be stored for the duration of the project plus three years.

Contact details:
If at any time you have any queries / issues about this study, my contact details are as follows:

Eoin Harte

Email: xxxxxx.

Tel: xxxxxx.

If you have concerns about this study and wish to contact someone independent, you may contact Mary Collins, MIREC Administrator, Research and Graduate School, Mary Immaculate College, South Circular Road, Limerick. Telephone: 061-204980 / E-mail: mirec@mic.ul.ie

Appendix I

Teacher Informed Consent Form

'An investigation into the impact of a teacher-based autonomy-supportive intervention programme on students' perceptions of their mental toughness'

Teacher Informed Consent Form

Dear Teacher,

As outlined in the **participant information sheet** the current study will investigate the potential influence that teachers can have on the mental toughness of their students through adopting autonomy-supportive practices in their teaching.

Details of what the study involves is contained in the **participant** information sheet. This letter should be read fully and carefully before consenting to take part in this study.

Your anonymity is assured, and you are free to withdraw from this study at any time. All information gathered will remain confidential and will not be released to any third party. In accordance with the MIC Record Retention Schedule all participant data will be stored for the duration of the project plus three years at which time it will be destroyed. Anonymised research data may be held indefinitely or as required by the Researcher.

Please read the following statements before signing the consent form.
•I have read and understood the **participant information sheet**.

•I understand what the project is about, and what the results will be used for.

•I am fully aware of **all** the procedures involving myself, and of any **risks and benefits** associated with the study.

•I know that my participation is voluntary and that I can withdraw from the project at any stage without giving any reason.

•I am aware that my results will be kept confidential.

Name (PRINTED): _____

Name (Signature): _____

Date: _____

Appendix J

Parent/Guardian Information Sheet

This information sheet is for parent(s)/guardian(s) of students at (school name) who are being invited to participate in the research study entitled **'An investigation into the impact of a teacher-based autonomy-supportive intervention programme on students' perceptions of their mental toughness'**

Name of Investigator: Eoin Harte, Mary Immaculate College (University of Limerick), Limerick.

Introduction

My name is Eoin Harte and I am a second-year student on the Professional Doctorate in Educational and Child Psychology (DECPsy) programme at Mary Immaculate College (University of Limerick), Limerick. I am doing research to investigate the potential influence that teachers can have in developing the mental toughness of their students through adopting autonomy-supportive practices in their teaching. My research supervisors are Dr. Therese Brophy and Dr. John Perry.

Consent Forms

Whenever researchers work with young people under the age of 18, we first explain the study to the parent(s)/guardian(s) and ask for their permission. If you agree to have your child participate, I will ask your child for their agreement as well. Both of you must agree independently before your child can take part in the research study.

Purpose

The purpose of this research project is to investigate if a young person's mental toughness can be enhanced through the autonomy-supportive practices of their teachers. Related to overall well-being, mental toughness is regarded as a personality trait like resilience which plays a significant role in determining how someone responds to stress, pressure and challenge. In recent years, research has focused on how it can be developed through training programmes and other interventions.

Procedure

For the purposes of this research, your child is invited to complete two questionnaires at the beginning of the study and again at the end (approximately three months later). These questionnaires will obtain a measure of your child's level of mental toughness and their beliefs on how autonomy-supportive their learning environment is.

Voluntary Participation

You do not have to agree that your child participates in this study. You can choose to say no and that will be no problem. You or your child may decide to decline this

invitation even after you have signed the consent form. Your child may stop engaging with the study at any stage.

Risks and Discomforts

It is not anticipated that your child will experience any risks or discomforts while participating in this study. They do not have to answer any question if they do not wish to do so. They do not have to give me any reason for not responding to any question.

Benefits

Participation in this study might help students to improve their level of mental toughness that may have benefits both in school and outside it. In other studies, mental toughness has been associated with improved overall well-being, increased instances of positive behaviour and better attainment at school.

Confidentiality

I will not be sharing information about your child, obtained through the program, with anybody except for my supervisors who guide me in the study. The information that I will collect will thus be kept confidential. Outside the scope of the research project, the data will only be used for presenting findings at relevant conferences and in the process of publishing the study. All confidential documentation regarding your child and the research will be locked away and no-one but myself and my supervisors will be able to see it.

Who to Contact?

If you have any questions you are welcome to contact me.

Eoin Harte   Email: xxxxxx   Telephone: xxxxxx

If you have concerns about this study and wish to contact someone independent, you may contact Mary Collins, MIREC Administrator, Research and Graduate School, Mary Immaculate College, South Circular Road, Limerick. Telephone: 061-204980 / E-mail: mirec@mic.ul.ie

Appendix K

Parent/Guardian Consent Form

Informed Consent Form for _____(Student Name)_____

This informed consent form is for parent(s)/guardian(s) of students at (school name) who are being invited to participate in the research study entitled **'An investigation into the impact of a teacher-based autonomy-supportive intervention programme on students' perceptions of their mental toughness'**

Name of Investigator: Eoin Harte, Mary Immaculate College (University of Limerick), Limerick.

I, parent/guardian of _____, have been asked to give consent for my child to participate in the research study. I have read the information sheet that was provided to me and I know what this study is about. I have had the opportunity to ask questions and any questions that I may have asked, have been answered to my satisfaction.

I hereby voluntarily give my consent.

Print Name of Parent/Guardian: _____

Signature of Parent/Guardian: _____

Date: _____

Please return this form in the envelope provided to your child's class teacher at your nearest convenience. Thank you.

Appendix L

Student Information Sheet

Information Sheet for Students

This information sheet is for children in 5th or 6th class who have been invited to participate in this research project and whose parent(s)/guardian(s) have already provided informed consent.

Title of the Project: 'An investigation into the impact of a teacher-based autonomy-supportive intervention programme on students' perceptions of their mental toughness'

Investigator's Name: Eoin Harte.

Introduction:

My name is Eoin Harte and I am a student at Mary Immaculate College in Limerick studying educational and child psychology. I am carrying out research looking at ways of improving a young person's mental toughness. What it means to have mental toughness is that a person could overcome stress, worry, or difficult things that might happen to them. For this project, I am especially interested in finding out if there are things teachers can do to help their students develop and improve their mental toughness.

In this sheet I am going to give you some information and invite you to be part of the study. After, you can choose whether you want to participate or not. Your parent(s)/guardian(s) have already been informed of this research and have given their permission for you to take part if you would like to. If you do not wish to take part in the research, you do not have to.

You may discuss anything in this form with your parent(s)/guardian(s) or friends or anyone else you feel comfortable talking to, like your teacher. You can decide whether to participate or not after you have talked it over. You do not have to decide immediately.

Purpose: Why are you doing this research?

I want to find out about ways that a young person's mental toughness can be developed so that they are able to deal better with difficult things and difficult times that might happen.

Choice of participants: Why are you asking me?

I am interested in looking at mental toughness in children your age because if you can improve your mental toughness at a younger age it might help you with things when you become a teenager and when you get older.

Participation is voluntary: Do I have to do this?

You do not have to be in this research if you do not want to be. It is totally up to you. If you decide not to be in the research, it is okay, and nothing changes. This is still your class, and everything stays the same as before. Even if you say "yes" now, you can change your mind later and that is still okay.

Procedures: What is going to happen to me?

If you decide that you want to take part, you will be asked to do two things.

1. I will call to your class and ask you to fill in some questionnaires that ask you different kinds of questions.
2. I will call to your class again about three-months later and ask you to fill in the same questionnaires that you filled in at the beginning.

Risks: Is this bad or dangerous for me?

There are no risks or bad things that will happen to you if you agree to take part.

Confidentiality: Is everybody going to know about this?

I will not tell other people that you are in this research and I won't share information about you to anyone who is not part of this research study. Information about you that will be collected will be put away and only my supervisors and I will be able to see it. Any information about you will have a number on it instead of your name.

Sharing the Findings: Will you tell me the results?

When I am finished the research, I will give you a paper with the main results written down. Afterwards, I will be telling more people, scientists and others, about the research and what I found. I might do this by writing and sharing reports and by going to meetings with people who are interested.

Right to Refuse or Withdraw: Can I choose not to be in the research? Can I change my mind?

You do not have to be in this research. No one will be mad or disappointed with you if you say no. It is your choice. You can think about it and tell us later if you want. You can say "yes" now and change your mind later and it will still be okay.

Who to Contact: Who can I talk to or ask questions to?

You can ask me questions now or later and you can also ask your teacher any questions when I am gone.

If you choose to be part of this research, I will also give you a copy of this paper to keep for yourself. You can ask your parent(s)/guardian(s) to look after it if you want.

If you have concerns about this study and wish to contact someone independent, you may contact Mary Collins, MIREC Administrator, Research and Graduate School, Mary Immaculate College, South Circular Road, Limerick. Telephone: 061-204980 / E-mail: mirec@mic.ul.ie

Thank you.

Appendix M

Student Assent Form

Informed Assent Form for Students

This information sheet is for children in 5th or 6th class who have been invited to participate in this research project and whose parent(s)/guardian(s) have already provided informed consent.

Title of the Project: 'An investigation into the impact of a teacher-based autonomy-supportive intervention programme on students' perceptions of their mental toughness'

Investigator's Name: Eoin Harte.

I understand that the research is about investigating ways in which a young person's mental toughness can be enhanced. I understand that at the beginning of the study I will be asked to complete some questionnaires and again at the end.

I have read the information sheet that was given to me and if I asked questions then they have been answered. I also know that I can ask questions later if I have any.

I agree to take part in the research.

Print name of child: _____

Signature of child: _____

Statement by the person taking consent

The information sheet has been read out to the potential participant, and to the best of my ability made sure that the child understands the purpose and procedures of this research.

I confirm that the child was given an opportunity to ask questions about the study, and all the questions asked by him/her have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of the information sheet has been provided to the participant.

Print Name of person taking the assent:

_____

Signature of person taking the assent:

_____

Parent/Guardian has signed an informed consent: Yes _____   No _____

Appendix N

Data Collection Timeline Overview

	Distribute Consent Forms	Pre-intervention Data Collection	Stage 1 of ASIP	Stage 2 of ASIP	Stage 3 of ASIP	Post-intervention Data Collection
School 1 *(Intervention Group)*	March 5th, 2019	March 12th, 2019	March 12th, 2019	April 9th, 2019	May 28th, 2019	May 28th, 2019
School 2 *(Intervention Group)*	March 4th, 2019	March 11th, 2019	March 11th, 2019	April 8th, 2019	May 29th, 2019	May 29th, 2019
School 3 *(Waitlist Control Group)*	March 4th, 2019	March 20th, 2019	October 8th, 2019			May 27th, 2019
School 4 *(Waitlist Control Group)*	March 5th, 2019	March 20th, 2019	October 9th, 2019			May 27th, 2019
School 5 *(Pilot School)*	March 4th, 2019	Pilot Study of questionnaires being used – March 7th, 2019.				

Student Pack

Section 1: Some Questions

Name (please fill in your first name and surname)**:**

My name is _____.

Age (please fill in)**:**

I am _____ years of age.

Gender (please fill in)**:**

I am a _____.

This year I am in…. (please circle one)

        5th class   6th class

My hobbies are…. (In this box, please write down some of the things that you like to do)

Section 2: Learning Climate Questionnaire – Student Version

Please remember:

- There are no right or wrong answers.
- Your teachers will not see your answers and no names will be used. A short report about what I find will be sent to you at your school.
- When I collect the questionnaires, I will change your name to a unique student ID number. The information collected will be safely stored.

What to do:

- When you turn this page, the first questionnaire contains statements about your experiences in your class. The second questionnaire contains statements about you as a person.
- Please read each statement carefully and circle the answer that shows how much you agree or disagree with each statement.
- Your responses are confidential and please be honest.
- If you make a mistake or would like to change an answer, then put an x through your old answer and circle your new answer.
- There are no right or wrong answers.

Here is a sample question.

Sample Question:

		Disagree a lot	Disagree a little	Neither agree nor disagree	Agree a little	Agree a lot
S	School holidays are fun.	1	2	3	4	5

Please circle the answer that is most true for you.

		Disagree a lot	Disagree a little	Neither agree nor disagree	Agree a little	Agree a lot
1.	I feel that my teacher gives me choices.	1	2	3	4	5
2.	I feel understood by my teacher.	1	2	3	4	5
3.	I feel that I can be open with my teacher about what I am thinking.	1	2	3	4	5
4.	I feel that my teacher sets tasks that I can do well at if I try.	1	2	3	4	5
5.	I feel that my teacher accepts me for who I am.	1	2	3	4	5
6.	I feel that my teacher makes sure that I understand the purpose of lessons and what I need to do.	1	2	3	4	5
7.	I feel that my teacher encourages me to ask questions.	1	2	3	4	5
8.	I feel a lot of trust in my teacher.	1	2	3	4	5
9.	I feel that my teacher answers my questions fully.	1	2	3	4	5
10.	I feel that my teacher listens to how I would like to do things.	1	2	3	4	5
11.	I feel that my teacher handles my feelings/emotions well.	1	2	3	4	5
12.	I feel that my teacher cares about me as a person.	1	2	3	4	5
13.	I like the way that my teacher talks to me in school.	1	2	3	4	5

		Disagree a lot	Disagree a little	Neither agree nor disagree	Agree a little	Agree a lot
14.	I feel that my teacher tries to understand how I see things before suggesting a new way to do things.	1	2	3	4	5
15.	I feel able to share my feelings with my teacher.	1	2	3	4	5
16.	I feel able to do my schoolwork most of the time.	1	2	3	4	5
17.	I feel confident when I am learning something new.	1	2	3	4	5
18.	I feel that my teacher notices the things that I am good at.	1	2	3	4	5
19.	I feel that I have learned new things in school this year.	1	2	3	4	5
20.	I feel that, in school, I get chances to show the things that I can do.	1	2	3	4	5
21.	I feel that I achieve something most days in school.	1	2	3	4	5
22.	I feel that I am not under too much pressure at school.	1	2	3	4	5
23.	I feel free to express my ideas and opinions in class.	1	2	3	4	5
24.	I feel that I can be myself in school.	1	2	3	4	5

Section 3: MTQPlus

What to do: Please answer these items carefully, thinking about how you are generally. Show your response by circling one of the numbers. Please complete all the items.

1 = Disagree a lot. 2 = Disagree a little. 3 = Neither Agree nor Disagree. 4 = Agree a little. 5 = Agree a lot.					
Start here at number 1					
1) I usually find something to motivate me	1	2	3	4	5
2) I generally feel in control	1	2	3	4	5
3) I generally feel that I am a worthwhile person	1	2	3	4	5
4) Challenges usually bring out the best in me	1	2	3	4	5
5) Other people usually listen to my ideas	1	2	3	4	5
6) Unexpected changes to my schedule generally throw me	1	2	3	4	5
7) I don't usually give up under pressure	1	2	3	4	5
8) I am generally confident in my own abilities	1	2	3	4	5
9) I usually find myself just going through the motions	1	2	3	4	5
10) At times I expect things to go wrong	1	2	3	4	5
11) I don't mind taking risks to achieve things	1	2	3	4	5
12) "I just don't know where to begin" is a feeling I usually have when presented with several things to do at once	1	2	3	4	5
13) I hate being told that something is impossible	1	2	3	4	5
14) I generally feel that I am in control of what happens in my life	1	2	3	4	5
15) However bad things are, I usually feel they will work out positively in the end	1	2	3	4	5
16) I like to know what's expected of me	1	2	3	4	5
17) Whenever I try to plan something, unforeseen factors usually seem to wreck it	1	2	3	4	5
18) I like pushing myself out of my comfort zone	1	2	3	4	5
19) I generally look on the bright side of life	1	2	3	4	5
20) I usually speak my mind when I have something to say	1	2	3	4	5
21) The unknown doesn't bother me. It's no longer unknown if I try	1	2	3	4	5
22) At times I feel completely useless	1	2	3	4	5

	1	2	3	4	5
23) When surprises occur, I welcome them	1	2	3	4	5
24) I can generally be relied upon to complete the tasks I am given	1	2	3	4	5
25) I usually take charge of a situation when I feel it is appropriate	1	2	3	4	5
26) I can normally concentrate for long periods of time	1	2	3	4	5
27) If I saw something wrong, I would draw attention to it	1	2	3	4	5
28) I am easily distracted from tasks that I am involved with	1	2	3	4	5
29) I generally cope well with any problems that occur	1	2	3	4	5
30) I do not usually criticise myself even when things go wrong	1	2	3	4	5
31) I generally try to give 100%	1	2	3	4	5
32) I manage to control my frustration well	1	2	3	4	5
33) I like goals and targets – they inspire me	1	2	3	4	5
34) I often feel uncomfortable in groups of people	1	2	3	4	5
35) When faced with difficulties I usually give up	1	2	3	4	5
36) I am generally able to react quickly when something unexpected happens	1	2	3	4	5
37) Even when under considerable pressure I usually remain calm	1	2	3	4	5
38) If something can go wrong, it usually will	1	2	3	4	5
39) Things just usually happen to me	1	2	3	4	5
40) I'll do something even if it scares me	1	2	3	4	5
41) I usually find it hard to find enthusiasm for the tasks I have to do	1	2	3	4	5
42) I can channel my emotions into positive actions	1	2	3	4	5
43) When I make mistakes, I usually let it worry me for days after	1	2	3	4	5
44) I am good at focusing on the task at hand	1	2	3	4	5
45) I am comfortable telling people what to do	1	2	3	4	5
46) I generally keep my emotions in check	1	2	3	4	5
47) I usually look forward to changes in my routine	1	2	3	4	5
48) I don't worry too much about what happens when I take a chance	1	2	3	4	5
49) I feel that what I do tends to make no difference	1	2	3	4	5

50) I like the idea that I can set and beat goals and targets for myself	1	2	3	4	5
51) If I feel somebody is wrong, I am not afraid to argue with them	1	2	3	4	5
52) I usually enjoy a challenge	1	2	3	4	5
53) I can usually control my nervousness	1	2	3	4	5
54) I don't mind setbacks, there's always something to learn from them	1	2	3	4	5
55) In discussions, I tend to back-down even when I feel strongly about something	1	2	3	4	5
56) When I face setbacks, I am often unable to persist with my goal	1	2	3	4	5
57) I can usually adapt myself to challenges that come my way	1	2	3	4	5
58) Sometimes I just can't hold my emotions inside	1	2	3	4	5
59) I'll give most things a go even if it stretches me	1	2	3	4	5
60) I usually find it difficult to make a mental effort when I am tired	1	2	3	4	5
61) I look for better ways of doing things	1	2	3	4	5
62) I usually set goals and targets when asked to do something	1	2	3	4	5
63) I can change my emotions to suit the situation	1	2	3	4	5
64) When I achieve a goal, I often try to set a higher one	1	2	3	4	5
65) I am motivated by tasks which have a clear purpose	1	2	3	4	5
66) When I have more than one thing to do, I can struggle to know where to start?	1	2	3	4	5
67) I find it difficult to set goals when I have several things to do	1	2	3	4	5
68) I can usually keep going even when it's hard to do so	1	2	3	4	5
69) Setbacks can often make me give up on a goal	1	2	3	4	5
70) I will always have a go when something needs to be done	1	2	3	4	5
71) I often think I don't know how to do something even when others think I do	1	2	3	4	5
72) I often think I don't have the skills that others say I have	1	2	3	4	5
73) I often feel that I can lift the mood of the people around me	1	2	3	4	5
74) I generally contribute what I know to discussions	1	2	3	4	5
End					

Mental Toughness and Autonomy Support

Appendix P

Data Collection – Teacher Questionnaire Pack

Teacher Pack

Section 1: Some Questions

Name (please fill in your first name and surname)**:**
_____.

Gender (please fill in):
_____

The class that I am teaching this year (please circle an option):
5th class   6th class

The number of years that I have spent as a qualified teacher (please enter the number of years):
_____ Years.

Any previous experience of Autonomy-supportive Teaching? (E.g. initial teacher training, CPD, visiting teacher, a personal interest, previous reading)

Section 2: Learning Climate Questionnaire – Teacher Version

Please remember:

- There are no right or wrong answers.
- Only the researcher will see your answers and no names will be used. A short report about what I find will be sent to you at the end of the study.
- When I collect this questionnaire, it will be assigned a unique teacher ID and all the information collected will be safely stored.

What to do:

When you turn the page, the questionnaire contains items that are related to your experiences with the students in your class. Teachers have different styles for interacting with students, and I would like to know more about how you feel about your encounters with your students. Your responses are confidential and please be honest. For each statement please circle the number that represents your level of agreement.

Here is a sample question.

Sample Question:

		Disagree a lot	Disagree a little	Neither agree nor disagree	Agree a little	Agree a lot
S	I am looking forward to the Easter holidays this year.	1	2	3	4	5

Please circle the answer that is most true for you.

	In general,	Disagree a lot	Disagree a little	Neither agree nor disagree	Agree a little	Agree a lot
1.	*I feel that I provide the students with choices.*	1	2	3	4	5
2.	*I feel that I understand the students in my class.*	1	2	3	4	5
3.	*I feel that the students can be open with me about what they are thinking.*	1	2	3	4	5
4.	*I feel I set tasks that the students can do well at if they try.*	1	2	3	4	5
5.	*I feel that I accept the students for who they are.*	1	2	3	4	5
6.	*I feel that I make sure that the students understand the purpose of lessons and what they need to do.*	1	2	3	4	5
7.	*I feel that I encourage the students to ask questions.*	1	2	3	4	5
8.	*I feel that the students trust me.*	1	2	3	4	5
9.	*I feel that I answer the students' questions fully and carefully.*	1	2	3	4	5
10.	*I feel that I listen to how the students would like to do things when possible.*	1	2	3	4	5
11.	*I feel that I handle the student's feelings and emotions well.*	1	2	3	4	5
12.	*I feel that I care about the students as people.*	1	2	3	4	5
13.	*I feel that I talk to the students in ways that make them feel good.*	1	2	3	4	5

14.	*I feel that I understand how the students see things before suggesting a new way to do things.*	1	2	3	4	5
15.	*I feel that the students can share their feelings with me.*	1	2	3	4	5
16.	*I set tasks at a level at which the students can achieve success regularly.*	1	2	3	4	5
17.	*I feel happy with how the students perform most of the time.*	1	2	3	4	5
18.	*I often notice the things that my students are good at and I tell them.*	1	2	3	4	5
19.	*I feel that the students are learning new things (skills and knowledge) this year.*	1	2	3	4	5
20.	*I feel that I give the students chances to show the things that they are good at.*	1	2	3	4	5
21.	*I feel that the students achieve some success most days at school.*	1	2	3	4	5
22.	*I feel that the students are not under excessive pressure at school.*	1	2	3	4	5
23.	*I feel that the students are free to express their opinions and ideas in class.*	1	2	3	4	5
24.	*I feel that the students can be themselves in school.*	1	2	3	4	5

Thank you!

Mental Toughness and Autonomy Support

Appendix Q

Teacher Observation Record Sheet

Autonomy-supportive Intervention Programme

Event Recording Form (Behaviour Count)

Target Person ID:
Person Completing this Form:
Date:
Time:
Lesson Topic:

Behaviour	Tally every time that the behaviour occurs	Total number of times behaviour occurred
1. Taking student's perspective.		
2. Promoting intrinsic motivation.		
3. Providing rationales.		
4. Acknowledging negativity.		
5. Using non-controlling language.		
6. Displaying patience.		
Any other observations/comments:		

Appendix R

Teacher Record of Behaviours Document

		Autonomy-supportive Behaviours – Teacher Record					
		1. Perspective-taking.	*2. Promote intrinsic motivation.*	*3. Provide rationales.*	*4. Acknowledge negativity.*	*5. Use non-controlling language.*	*6. Display patience.*
Week 1	M						
	T						
	W						
	T						
	F						
Week 2	M						
	T						
	W						
	T						
	F						
Week 3	M						
	T						
	W						
	T						
	F						
Week 4	M						
	T						
	W						
	T						
	F						

Appendix S

Teacher Reflective Questionnaire

Today's Date:
Have you had a chance to use any of the autonomy-supportive behaviours (covered in the first workshop) in your teaching over the last number of weeks?
From the first workshop, are there any behaviours that you like and/or like to use?
Do you feel that any of the autonomy-supportive behaviours are not practical?
Is there anything else related to this area of teaching that you would find useful/helpful?
Is involvement in this project a good use of your time?
Is there anything that you would change about the 2 workshops?
Since the first workshop, have you noticed anything in your students that you may not have noticed before?
Is there anything else that you would like to add?

Appendix T

ASIP Materials

Appendix T1

Outline of ASIP Intervention

Autonomy-supportive Intervention Programme for Teachers

Introduction: When autonomy-supportive intervention programmes (ASIPs) are designed and implemented they can help teachers develop a more autonomy-supportive style of teaching and create a classroom environment that fosters autonomy in students (Reeve & Cheon, 2016). These kinds of teaching styles and classroom environments have been shown to be positively linked with teacher-student relationships, improved well-being of the both the students and the teacher and improved student achievement overall (Powell, 2011). In this present study, the potential effect of these factors on developing a student's mental toughness is the focus of investigation. In terms of the design and structure of an ASIP, a meta-analysis of those that have been used in past studies indicates the need for a six-hour programme broken up into three different stages and highlights what should be included at each stage. This information has been considered for the purposes of this proposed piece of research and is outlined below. It should be noted that the principal investigator of this proposed piece of research will deliver the programme.

Stage 1: 2-hour workshop.

- Provide an introduction and an overview of what is involved in an ASIP referencing past studies and potential benefits of involvement.
- Participating teachers engage in an individual reflective activity on their own teaching style. They are presented with, and asked to analyse, a description of two types of teachers and identify as to which one they see themselves as being most closely related. One of the styles in more autonomy-supporting while the other is more controlling in nature. This initiates a group discussion on what are some possible elements of an autonomy-supportive teaching style and classroom environment.
- The ASIP will be placed in the context of SDT for the teachers and the existing links will be explored and discussed.
- The teachers will be introduced to some of the most widely validated autonomy-supportive instructional behaviours and how they relate to their own teacher practice. These include taking students' perspectives, providing explanatory rationales, using non-controlling language and displaying

patience. Ideas around how they can be implemented and used in a practical sense will be explored.

- The benefits of autonomy-supportive teaching styles will be revisited, and time will be spent looking at potential obstacles to developing a more autonomous style of practice.

Stage 2: 2-hour Group Discussion Follow-up Session.

- At this stage, the teachers will have had an opportunity to implement some autonomy -supportive practices. As a result, collaborative discussion will form the basis of this session where the group of teachers will reflect on the autonomy-supportive behaviours that they have employed in their practice since participating in stage one. A focus will be placed on what has been working well and what might the difficulties and challenges being experienced are.
- During this session, the teachers will re-visit the autonomy-supportive strategies in thinking about what else they can possibly implement.
- At this point in the programme the teachers will re-complete the teacher version of the learning climate questionnaire in seeing how autonomy-supportive they feel their teaching style is currently. They would have already completed this questionnaire at the initial stages of the study.

Stage 3: 2-hour Group Discussion Follow-up Session.

- This final stage of the programme will provide the opportunity to share ideas and experiences and reflect on any changes to their teaching style and approach to teaching over the past three months based on their participation with the ASIP.
- The teachers will again complete the teacher version of the learning climate questionnaire in seeing how autonomy-supportive they feel their teaching style is currently.

Autonomy-supportive Intervention Programme

Teacher Notes

What is it?

What teachers say and do to try and promote student engagement in learning activities is the essence of autonomy support. In this regard, when autonomy-supportive intervention programmes (ASIPs) are designed and implemented they can help teachers develop a more autonomy-supportive style of teaching and create a classroom environment that fosters autonomy in students (Reeve & Cheon, 2016). These kinds of teaching styles and classroom environments have been shown to be positively linked with teacher-student relationships, improved well-being of the students and the teacher and improved student achievement overall (Powell, 2011).

What does it involve?

ASIPs are often delivered to teachers in 3 parts using a workshop format. Each of the workshops are interactive and multi-modal in nature. They focus on the 'what is it' and 'how to do it' of autonomy-supportive behaviours and incorporate discussion and reflection of the teachers' experiences, views and opinions.

What are the benefits for students?

Students' Educational Benefits from Teacher-Provided Autonomy Support

Motivation	Engagement	Development	Learning	Performance	Psychological Well-Being
Intrinsic motivation[12,14,19,34]	Engagement[3,19,21,32,38]	Self-esteem and self-worth[12,14]	Conceptual under-standing[5,7,15,17,41,42]	Grades[6,9,18,39,41]	Psychological well-being[6,8,13,23,]
Competence[6,14,35,44]	Positive emotion[16,30,35]	Creativity[1,23]	Deep processing[41,42]	Task performance[7,15,16]	School/Life satisfaction[22,24]
Autonomy[9,31,34]	Less negative emotion[2,6,20,28]	Preference for optimal challenge[9,14,36]	Active information processing[25]	Standardized test scores[9]	Vitality[26,27,29]
Relatedness[4,21]					
Mastery motivation and perceived control[14,35]	Class attendance[9]		Self-regulation strategies[43]		
Curiosity[14]	Persistence[10]				
Internalized values[11,18,33]	School retention (vs. dropping out)[20,40]				

What are the skills involved?

1. Understanding and building student's capacity to motivate and engage themselves in their learning.
2. Promoting intrinsic motivation that develops an innate desire to learn.
3. Promoting the internalisation of what students are learning.

What are the targeted teacher behaviours to develop the skills (could put this page somewhere accessible for you in your classroom)?

1. *Take the Student's Perspective.*
- <u>Before a lesson,</u> ask the student's if there is anything that they would like to know; "what would you like to do/learn about?", "what are you curious to know more about?" (could try this with an SESE topic to begin with).
- <u>During a lesson,</u> provide the students with some choices or opportunities to choose.
- <u>After a lesson/topic,</u> ask the students if there is anything else that they would like to know or find out more about (could do this in an open format or anonymously).

2. *Promote Intrinsic Motivation.*
- Develop **'one-page profiles'** with your class that provide you with an idea of their individual strengths and needs which can be incorporated into instruction.
- Engage in weekly **'circle time'**. The students can share one thing about them, talk about something that they are good at, one thing that they would like in the classroom or something that would help them to learn better.
- Encourage weekly **'student reflections'** (see template).
- Promote **'optimal challenges'** in the classroom that develop a sense of challenge in the students. E.g. giving students small topics for preparation and presentation in groups.

3. *Provide Rationales.*
- Thinking about accompanying **classroom requests** with a **rationale** for doing it.
- Explaining to the students **why** they are covering a topic and what is the **benefit** of the related skills and knowledge for them.

4. *Acknowledge Negativity.*
- <u>Acknowledge the negative feelings</u>; "I can see that you are finding this activity especially hard".
- <u>Accept the negative feelings</u>; "I know that this is a hard topic to work at and finding it hard is normal".
- <u>Welcome suggestions to improve the situation</u>; "What would help you to be better at this?".

5. *Use Non-Controlling Language.*
- Trying to use language that **minimizes pressure** while also conveying some **choice** and **flexibility**.
- Thinking about using "should", "have to" and "musts" less and using **"could you", "choose to"** and **"what if…"** more.

6. *Display Patience.*
- Giving some **extra time** for the students to learn at the own pace.
- As a teacher, try and avoid rushing in to fix a problem or offer a solution when a student is finding something particularly difficult.

Mental Toughness and Autonomy Support

Appendix T3

Student Daily Reflection Template

This week,
I learned that…
I relearned that…
I was surprised that…
I still want to know…

Appendix T4

Lesson Plan Resource

Autonomy-supportive Practice - *Lesson Plan Resource*

Pre-Lesson
Planning and Preparing • Take the students' perspective; asking the students what they would like to know/know more about regarding a topic, thinking about the students' interests, strengths and preferences (e.g. your own knowledge, one-page profiles).
Starting the Lesson
Inviting students to engage in the learning activity • Provide explanatory rationales; using statements that help the students to understand why engaging in the learning has use/benefit and importance. • Promoting intrinsic motivation; incorporating activities which involve co-operative learning, offer optimal challenges (not too hard or not too easy) and develop student experimentation and initiative.
During the Lesson
Thinking about what can further develop student autonomy • Relying on non-controlling language; using language that minimises pressure and offers choice. • Acknowledging negative feelings if these arise; acknowledge the feelings, accept the feelings and welcome suggestions around possible solutions. • Display patience: allowing enough time for the students to respond, complete an activity and show progression. If required, offer hints for the students that can guide and bring them along.
Ending the Lesson
▪ Encouraging reflection by welcoming student's thoughts, feeling and views (e.g. using the student reflection template). ▪ Ending lessons with questions that get the students to take responsibility for their learning. For example, if there anything else that they would like to learn about/find out more about/are curious about.
Post-Lesson
▪ Taking the students' perspective again in assessing what their experiences of the lesson might have been and where to go next with their learning.

Guideline for my way of teaching: Autonomy-supportive teacher's motivational style

Teachers can engage students when they offer high levels of both autonomy support and structure. This autonomy-supportive motivation style is an important element in a high-quality teacher-student relationship. Teachers can struggle with the level of autonomy they should give students, so that they can learn through experience and demonstrate what they are capable of, and the amount of structure I should provide, so I'm sure that they will learn what they need to learn.

Autonomy-supportive teacher

Opposite of an autonomy focused teacher is the controlling teacher who interferes with students' self-determination by asking students to adhere to their own agenda, which alienates the students from their inner motivational resources. This type of teacher defines what students should or must do. Controlling teachers often offer extrinsic rewards and pressuring language to shape students into compliance with their agenda. An autonomy-supportive teacher facilitates by identifying and nurturing students' needs, interests and preferences.

What do autonomy-supportive teachers do?

Nurture inner motivational resources

These teachers find ways to coordinate the instructional activities they offer with students' preferences, interests, sense of enjoyment, sense of challenge, competencies and choice making. Meaning they are truly interested in what a student thinks and drives them. Being able to connect with students and use that knowledge to make instruction more meaningful is an essential quality for an effective teacher.

Rely on informational, non-controlling language

These teachers give informational and flexible messages, instead of controlling and rigid. They give feedback (in the correct way) that relates to the student's progress, results and self. If they notice that students are not listening, give poor performances or show inappropriate behaviour, they consider it as a problem to be solved instead of pressuring students into compliance with the teacher's agenda. The autonomy-supportive teacher will try to find out what the underlying cause is, and take the action needed.

Communicate value and provide rationales

Autonomy-supportive teachers try to identify and explain the use, value and/or importance of why a student should take the effort to do the assignment. There are always learning activities that do not address the intrinsic motivation of students.

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Autonomy-supportive teachers help students generate self-determined motivation by articulating why the undertaking is useful.

Acknowledge and accept students' expressions of negative affect

If protests arise in the classroom, because students don't want to do what the teacher asks of them, the autonomy-supportive teacher will use that negative response as input on how to improve their instruction or express the value and rationales for learning. They welcome the ensuing discussion of how the source of resistance might be reengineered into something that's worth doing.

Autonomy-supportive behaviours

The following behaviours function as autonomy-supportive: listen carefully, create opportunities for students to work in their own way, provide opportunities for students to talk, arrange learning materials and seating patterns so students manipulate objects and conversations rather than passively watch and listen, encourage effort and persistence, praise signs of improvement and mastery, offer progress-enabling hints when students seem stuck, are responsive to students' questions and comments and communicate a clear acknowledgement of student's perspectives.

Structure

The previous points address the issue of motivating students. What do autonomy-supportive teachers do in relation to structure? Instruction revolves around teachers communicating clearly what they expect students to do to achieve academic goals. It involves offering of plans, goals, standards, expectations, schedules, rules, directions, challenges, reminders, prompts, moments for feedback, evaluation. Structure is always needed, but how you offer this structure determines whether it will be helpful to motivate students or not. Teachers who use autonomy-supportive motivational style (as mentioned before) have a different effect on students than the controlling teacher who does not address the inner motivation of the student. An autonomy-supportive teacher will give a student 'freedom within limits' (Rogers, 1969), so the student can link the activities to their inner motivational resources. If the student is not able to connect, it will resist, not perform well or be demotivated. The autonomy-supportive teacher will then approach the student and find ways to motivate them by making clear the 'why' of the structure and find ways to link it with the student's inner motivation. The goals are set, but the autonomy-supportive teacher uses the five behaviours mentioned before to invest in the student-teacher relationship through attuning (or sensitivity for student's perspective), relatedness (gives the student a feeling of specialness and importance), being supportive (affirmation of a student's capacity for self-direction) and gentle discipline through guiding and explaining.

Students will benefit mostly when teachers act as facilitators of their inner motivation – facilitators who structure the learning environment in ways that nurture, involve, and expand on (rather than neglect, thwart, and bypass) their inner motivational resources.

Appendix T6

Evidence from Swedish Schools

Practice in Swedish Schools

For starters, the schools are "happy"; cosy, colourful classrooms with age-appropriate material and pupils' work displayed on the walls; bookcases full of books and board games; sofas, pillows and Pilates balls, where pupils can sit whenever they want to take a break from their chairs if they feel uncomfortable; an "escape room", decorated by the pupils themselves, where they can slip away whenever they feel the need to take a bit of time off on their own, or with their friends; a massive playground near the forest, where they can run, hide, play on the swings or do sports. The learning environment contributes to high-quality learning. However, this wouldn't have been achieved without an education system which values both students and teachers. The child-centred and student-led education system, the flexibility and freedom that teachers have so they can use their initiative, and all the support that both students and teachers get by law, have contributed to Sweden being a top country in education.

Curriculum as a guide

Teachers are free to use their *initiative* and take their students' experiences, perspectives and needs into account when planning.

Differentiation and accommodation in the foreground

Teachers take their *students' needs into account* and they adapt their lessons accordingly. *Learning is for all.*

Exams as a tool

Exams and tests are used to *facilitate* teachers in assessing their students understanding as well as for planning for future instruction.

Having fun

Play and art are very important in learning. Games and/or art are included as part of most lessons.

Homework

Homework is given in the form of tasks to be completed at the weekend. This aim is to *shape* students into *responsible* individuals and to also *engage parents* in their learning.

Reading for pleasure

A lot of schools in Sweden plan projects that *encourage* students *to read* by organising reading activities and rewarding them.

Autonomy Supportive Intervention Programme (ASIP)

What is it? A step-by-step plan of action to help teachers become more autonomy supportive.

Function? How teachers can incorporate more autonomy support in their practice that promotes student engagement in learning activities.

ASIP, Eoin Harte (MIC), 2019

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Autonomy Supportive Intervention Programme (ASIP) - Overview

Table 2. Common Characteristics of the Most Effective Autonomy-Supportive Teacher Intervention Programs.

1. Offer a workshop experience that features all (rather than only a subset) of the following categories of autonomy-supportive instructional behaviors:
   - Take the students' perspective during instruction,
   - Vitalize inner motivational resources,
   - Rely on noncontrolling, informational language,
   - Provide explanatory rationales for requests,
   - Display patience to allow time for self-paced learning to occur,
   - Acknowledge, accept, and even welcome negative affect as okay.
2. Deliver the training experience in multiple sessions (rather than in a single session).
3. Include a group discussion component where teachers can express their concerns, doubts, and reservations and also share ideas and exchange instructional strategies.
4. Offer teachers ongoing support throughout the intervention's semester-long implementation.
5. Emphasize not only content (what to do) but also skill-based training (how to do it).
6. Address teachers' pretraining beliefs about motivating style that might otherwise conflict with the training message.

ASIP, Eoin Harte (MIC), 2019

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Outline of the ASIP

- **Stage 1 (today):** Teachers engage in a workshop to learn what autonomy support is and how to do it.

- **Stage 2 (April):** Teachers engage in a workshop focusing more on the 'how to' of autonomy support along with group discussion of experiences to date.

- **Stage 3 (May):** Teachers engage in a group discussion on experiences of AS practices and work together to solve any issues arising.

ASIP, Eoin Harte (MIC), 2019   9

Workshop 1 - Outline

1. Background information on the ASIP.
2. Teacher activity.
3. Evidence from previous studies.
4. **Autonomy supportive behaviours.**
5. Benefits of using AS as a teacher.
6. Potential barriers to greater AS.
7. Between now and the next day.

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Self Determination Theory (SDT)

- From a SDT perspective, the source of student activity are the 3 psychological needs of...
  - **Autonomy:** Experience personal control in goals.
  - **Competence:** To be effective and achieve success.
  - **Relatedness:** To establish close connections and attachments with others.

- Across the lifespan and in many domains (education, sport, business) people function positively when others support their **autonomy** rather than control their behaviour.

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Autonomy and Student Behaviours

Poor Performance
- Students' work is sloppy, careless.
- Students underperform class standards.
- Students feel lost, overwhelmed by classroom challenges.
- Amotivated students.

Disengagement
- Students fail to involve themselves in the learning activity.
- Students are off-task.
- Students fail to participate.
- Students show little initiative.
- Students sit passively in class.
- Student procrastinate.

Misbehavior
- Students act irresponsibly.
- Students act disrespectively.
- Students break rules.
- Students disregard classroom procedures.

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Activity One – A Personal Reflection

- Reflect on your own **teaching style.**
  - *Think about your current classroom and group of students.*
  - *What do you use to motivate the students?*
  - *How connected do you feel to the class group?*
  - *How influenced are you by the teachers you had in your life?*
  - *What is your over-arching goal for the students in your class?*
  - *What would your students say if they were asked?*
  - *How much of an impact does how you were taught impact on your teaching style now?*

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Motivating Style of Teachers

- What teachers *say and do* during teaching to motivate their students to engage in learning activities.

Autonomy-Supportive   **Neutral**   **Controlling**

*Teacher's **Tone** during Student-Teacher Interactions:*	*Teacher's **Tone** during Student-Teacher Interactions:*
• I am your ally.	• I am your boss.
• I will help you.	• I will monitor you.
• I am here to understand and support you.	• I am here to socialize and change you.

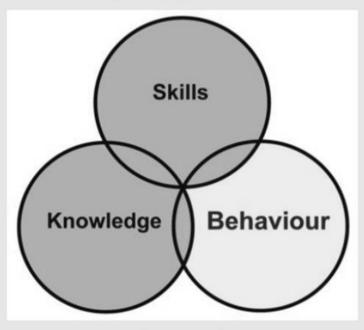ASIP, Eoin Harte (MIC), 2019   14

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Evidence from Previous Studies

- Outcomes of increased autonomy support.
- For **students**...
  - Better engagement.
  - Enjoyment of school.
  - Improved academic achievement.
  - Greater pro-social behaviour.
  - Improved relationship with teacher.
- And **teachers**...
  - Gain new skills.
  - Improved well-being.
  - Greater job satisfaction.
  - Improved relationships with students.

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Autonomy Support in Practice

Skills

Knowledge   Behaviour

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Three Essential Skills *(Behaviours)*

1. **Understanding and building your students' capacity to motivate and engage themselves** *(perspective-taking).*

2. **Promoting intrinsic motivation** *(try and tap into what motivates the student).*

3. **Promoting the internalization of what students are learning** *(provide rationales, rely on non-controlling language, acknowledge expressions of negativity, display patience).*

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6 Main Instructional Behaviours

1. Perspective-taking.
2. Promote intrinsic motivation.
3. Provide rationales.
4. Acknowledge negativity.
5. Use non-controlling language.
6. Display patience.

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1. Perspective-Taking

What it is:

- The teacher's imagines being in the position of the student.
- Teacher is mindful of students' talents, wants, needs, and priorities.

How to do it:

- Prepare the lesson from the students' point of view.
- Try and encourage students' input, suggestions, and improvements to future instruction.
- Welcome, invite, encourage, and incorporate students' input into the lesson plan and the on-going flow of instruction.
- Provide some choices/opportunities to choose.

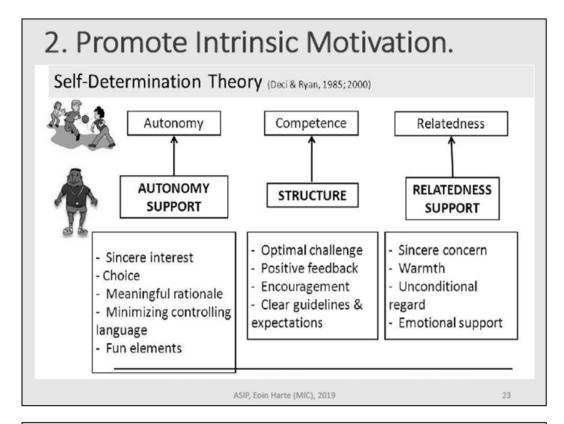ASIP, Eoin Harte (MIC), 2019   19
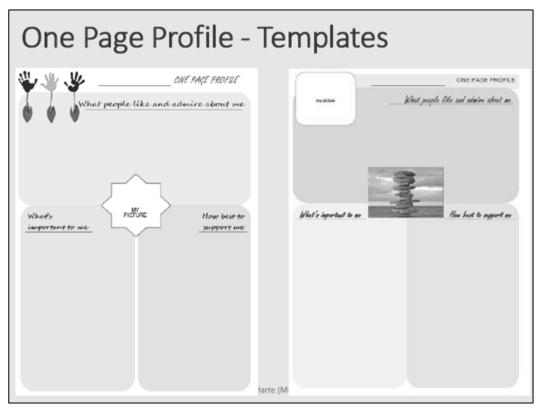

Clip 1

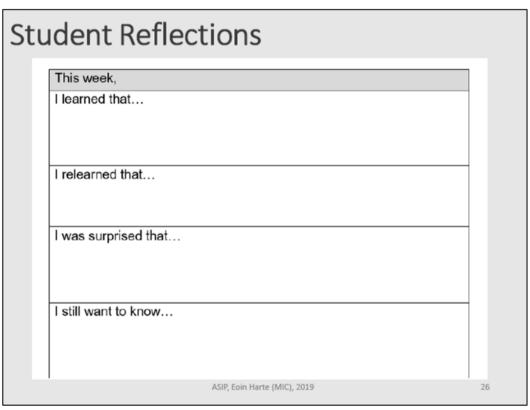ASIP, Eoin Harte (MIC), 2019   20

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2. Promote Intrinsic Motivation.

Self-Determination Theory (Deci & Ryan, 1985; 2000)

Autonomy	Competence	Relatedness
AUTONOMY SUPPORT	**STRUCTURE**	**RELATEDNESS SUPPORT**
- Sincere interest - Choice - Meaningful rationale - Minimizing controlling language - Fun elements	- Optimal challenge - Positive feedback - Encouragement - Clear guidelines & expectations	- Sincere concern - Warmth - Unconditional regard - Emotional support

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2. Promote Intrinsic Motivation.

- Involve autonomy.
- Involve relatedness.
- Involve competence.

WHAT MOTIVATES YOU?

- Consider 'one-page profiles' that reinforce that everyone has strengths and areas of need.

- 'Circle Time': Sharing one thing about me, one thing I am good at, one thing which could help me to learn better, one thing I would like in the classroom.

- The use of 'Student Reflections' (see template).

- Using 'Optimal challenges' in the classroom. E.g. giving students small topics for preparation and presentation in groups.

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One Page Profile - Templates

_____ ONE PAGE PROFILE

What people like and admire about me

What's important to me

MY PICTURE

How best to support me

ONE PAGE PROFILE

_____ What people like and admire about me

my picture

What's important to me

How best to support me

Harte (M

Student Reflections

This week,
I learned that…
I relearned that…
I was surprised that…
I still want to know…

3. Provide Rationales

What it is:

* Verbal explanations to help students understand why self-regulation of the activity has personal use. Explanations to help students transform (i.e., internalize) *something not worth* doing into *something worth doing*—something worth their time, attention, and effort.

How to do it:

(1) Teacher communicates that the activity, request, rule, or procedure is *useful*.

(2) Teacher explains *why* the activity is useful—why it has personal benefit to the student.

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Clip 1

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4. Acknowledge Negative Feelings

What it is:

Teacher acknowledges that, yes, a request may cause some negative feelings and that these are potentially valid and legitimate reactions to the request. The teacher then invites suggestions in what can be done to remove that negative affect (while still fulfilling the teacher's request).

Acknowledge negative feelings:
"*I see* that you are not very enthusiastic about...."

Accept them as potentially valid reactions:
"*Yes*, we have practiced this skill many times before, haven't we?"

Welcome suggestions to solve the motivational problem:
"*Okay*. So, what might we do differently? Any suggestions?"

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Clip 1

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Clip 2

5. Use Non-Controlling Language

What it is:

- Verbal and nonverbal communications that minimize pressure (absence of "should," "musts," "have to's", and "got to's") while also conveying choice and flexibility.

How to do it:

(1) *Invitational Language*: Instead of directing students to do something ("Do what I told you" or "Hurry, get started…"), use invitational language ("You may want to try…") to help students get started on a task (the idea: students start the task on their own).

(2) *Informational Language*: Help students solve their own problems, as in "I've noticed that you are finding this hard; is that right? Do you know why that might be? Do you know what you could do differently to make it easier?
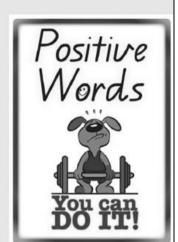
Some words to think about using <u>less</u>

"You", "but", "always", "never", "should", "must", "need", "can't", "easy", "just", "only", "fast".

Some words to think about using <u>more</u>

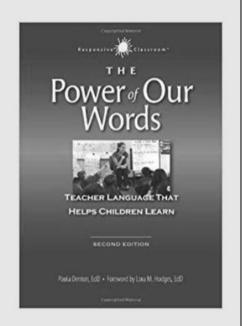*"If", "could", "yes", "together", "choose to", "and", "because", "try", "their name".*

Positive Words — You can DO IT!

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Handout

- Emphasise 'within' as opposed to 'between' student comparison. Motivates students to improve on their own performance.

Responsive Classroom
THE
Power of Our Words
TEACHER LANGUAGE THAT HELPS CHILDREN LEARN
SECOND EDITION
Paula Denton, EdD • Foreword by Lora M. Hodges, EdD

ASIP, Eoin Harte (MIC), 2019   34

6. Display patience

Wait for students' input, initiative, and willingness. Give students the time and space to experiment, to work at their own pace, and to problem-solve.

How to do it:

When asking students to learn something new, when asking students to develop a complex skill, when learning activities require problem-solving and reflection.

Do's: Give students the time and space they need to work and experiment. Watch, listen, be responsive, provide help when/if asked.

Do not's: Tell the student the answer or correct behavior and then make them copy you (e.g., "Do it this way; Do it like I showed you").

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Clip 1

고려대학교
KOREA UNIVERSITY

#1 Outline
#2 1st draft

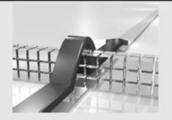ASIP, Eoin Harte (MIC), 2019   36

Benefits of AS

- Students become **autonomous** and not anonymous.
- Meets their psychological needs (autonomy, relatedness and competence).
- By autonomous, it is meant...
  - *Self-reliant.*
  - *Independent.*
  - *Responsible and capable.*
  - *Self-confident in learning and living.*

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Barriers of AS

- Finding ways to help young people to build autonomy is a **long-term venture**.
- Hard to break/change **habits** of teachers and students.
- Broader **educational context** that teachers are in (e.g. curriculum demands, class sizes).
- Change in education is a **slow process**.
- It's great to know "what to do" but an equal emphasis needs to be placed on **"how to do it"**.

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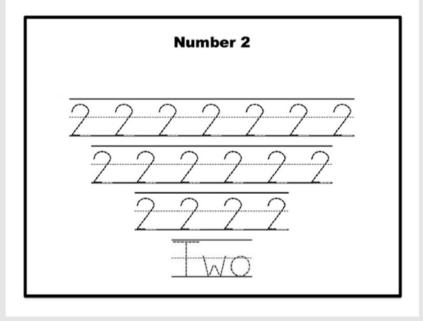
Summary – Between now and workshop 2

1. Look over the notes and today's new knowledge and information.
2. Trial and practice the behaviours when you can (personalize and adjust them if necessary).
3. Keep a tally record of the behaviours you trialed when you can.
4. I can send on some additional information and resources to your email address.
5. Date for workshop 2? What suits?

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Workshop 2

Number 2

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Activity

- Think about what makes a positive classroom environment for students? What would the students say?

Activity

- Think about what makes a positive classroom environment for students? What would the students say?

  - Know your students
  - Practice little gestures that matter
  - Reveal your personal self
  - Create and maintain an inviting classroom
  - Encourage a culture of acceptance and compassion
  - Help students find their voice
  - Learn to listen
  - Speak carefully
  - Help students be autonomous, not anonymous
  - Build resiliency
  - Encourage imagination and creativity
  - Infuse humor

Workshop 2 - Outline

- Opening activity.
- Autonomy Support – revisited.
- Experiences to date – reflective activity and group discussion.
- **Autonomy Support in a lesson plan.**
- Some additional resources.
- Between now and the final day.

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Autonomy Support Revisited

Goals of Autonomy Support

1. Helping teachers **become more autonomy supportive** by developing their motivating style.

2. Creating **classroom conditions** and **student relationships with teachers** that allow for student needs to be met.

3. **Educational outcomes;** engagement, achievement, pro-social behaviour, attendance, etc.

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Autonomy Support Revisited

- **Enabling Conditions**
  - Think about the student's perspective.
  - Invite student's thoughts, feelings and actions into the flow of the instruction.

- **Autonomy Supportive Behaviours**
  - Promote intrinsic motivation.
  - Provide rationales.
  - Use non-controlling language.
  - Display patience for self-paced learning.
  - Acknowledge and accept negative feelings.

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Autonomy Support in Practice (1/3)

1. **Perspective-Taking.**
   - When planning lessons, invite _input_ from the students around _what they want to know_.
   - During the lesson, provide _opportunities to choose_ and welcome student input.

2. **Promote Intrinsic Motivation.**
   - Identifying and implementing learning experiences that are _relevant and meaningful_ for the students.
   - Aligning activities with students' _preferences, interests, sense of challenge_ and _sense of enjoyment._

ASIP, Eoin Harte (MIC), 2019

50

2. Promote Intrinsic Motivation (cont.)

1. Provide choice
2. Encourage students' experimentation and self-initiation
3. Foster students' willingness to take on challenges, explore new ideas and persist at difficult activities
4. Offer optimal challenges (neither too easy, nor too difficult)
5. Provide feedback that is not evaluative of the person
6. Give meaningful rationale for requested behavior
7. Acknowledge feelings
8. Set up cooperative learning opportunities

ASIP, Eoin Harte (MIC), 2019   51

Autonomy Support in Practice (2/3)

3. Provide Rationales
  • Developing statements that help the students to understand why engaging with the activity has a _personal use, benefit, importance._

4. Acknowledge negativity.
  I.   _Acknowledge_ the negative feelings.
  II. _Accept_ the feelings.
  III. _Welcome suggestions_ that might improve the situation.
  • Aim is to empathise with the students.

ASIP, Eoin Harte (MIC), 2019   52

Autonomy Support in Practice (3/3)

5. Use Non-Controlling Language.
- Language that _minimises pressure_ and conveys a sense of choice and flexibility for the students.
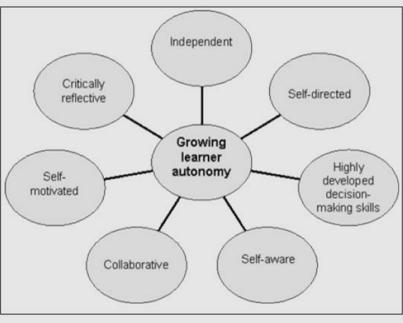- Absence of 'should', 'must', 'have to'.

6. Display Patience.
- Allowing students _enough time_ to respond/show progression before providing and answer.
- If needed, think about offering _hints_ that guide students towards a correct answer.

ASIP, Eoin Harte (MIC), 2019   53

Benefits of Developing Autonomy Support

ASIP, Eoin Harte (MIC), 2019   54

Experiences to Date
Reflection and Discussion

- Your experiences.
- Practicality.
- What are you finding tricky?
- What else would help?
- Is it useful/worthwhile?
- Any changes?

Autonomy Supportive Practice
Teacher Reflection

Today's Date:

Have you had a chance to use any of the autonomy supportive behaviours (covered in the first workshop) in your teaching over the last number of weeks?

From the first workshop, are there any behaviours that you like and/or like to use?

Do you feel that any of the autonomy supportive behaviours are not practical?

Is there anything else related to this area of teaching that you would find useful/helpful?

Is involvement in this project a good use of your time?

Is there anything that you would change?

ASIP, Eoin Harte (MIC), 2019   55

Autonomy Support
Lesson Plan (Handout)

Autonomy Supportive Practice
Lesson Plan Resource

Pre-Lesson

Planning and Preparing
- Take the students' perspective: asking the students what they would like to know/know more about regarding a topic, thinking about the students' interests, strengths and preferences (e.g. your own knowledge, one-page profiles).

Starting the Lesson

Inviting students to engage in the learning activity
- Provide explanatory rationales: using statements that help the students to understand why engaging in the learning has use/benefit and importance.
- Promoting intrinsic motivation: incorporating activities which involve co-operative learning, offer optimal challenges (not too hard or not too easy) and develop student experimentation and initiative.

During the Lesson

Thinking about what can further develop student autonomy
- Relying on non-controlling language: using language that minimises pressure and offers choice.

ASIP, Eoin Harte (MIC), 2019   56

Autonomy Support
Additional Resources

- Evidence from Swedish schools (Handout).

- 12 Tips for Teachers (Reading).

- Autonomy Supportive Teaching; What is it and how to do it? (Reading).

- Lesson Plan Resource (Handout).

- 'Support for Me' (Student Resource).

ASIP, Eoin Harte (MIC), 2019   57

Summary – Between now and workshop 3

ACTION PLAN

WHO	WHAT	WHEN	HOW

1. Look over today's material; the lesson plan resource in particular.
2. Trial and practice the behaviours when you can (personalize and adjust them if necessary).
3. Keep a tally record of the behaviours you trialed when you can.
4. I will send on some additional information and the resources to your email address.
5. Date for final day? What suits? Questionnaires again with the students.

ASIP, Eoin Harte (MIC), 2019   58

Appendix U

Thematic Analysis of the Qualitative Data Generated from the Reflective Questionnaires

A four-step approach to thematic analysis, adapted from Braun and Clarke (2006), was used for analysing the qualitative data generated from the reflective questionnaires completed by the teacher participants during workshop 2 and workshop 3 of the ASIP intervention (Maguire & Delahunt, 2017). The steps completed are outlined in detail below and the results are presented in the results section of the empirical pater contained in chapter 3 of the thesis.

Step 1: Collation of the data gathered from the teacher questionnaires during workshop 2 and workshop 3 of the ASIP.

> *Which are the behaviours that you like to use most often in your teaching?*
> - **T1**: Giving rationales as pupils understand more and take a greater interest in their learning. Acknowledging negative feelings as this can often arise especially with older pupils.
> - **T2:** Giving choices, using the pupil profile, listening more to pupil input, using the 'what did you learn?' handout, using patience to give children a "real" chance to express themselves and stopping myself from "diving in" to help.
> - **T3:** Giving pupils choices and being aware of using non-controlling language like 'should' and 'must'.
> - **T4:** Giving choices which have motivated the students, providing rationales and trying to promote intrinsic motivation.
> - **T5:** Giving choice which the children really enjoyed, giving rationales for lessons and learning and acknowledging negative feelings (especially towards the subject of Irish).
> - **T6:** Giving the kids more freedom and choice (to pick project titles for example) has given them more ownership over their learning. Being able to decide on working groups themselves.
> - **T7:** Giving choices and autonomy in choosing what they learn to get the students more involved in the learning process.
> - **T8:** The use of non-prescriptive and non-controlling language that has fostered greater student engagement in lessons. Providing students with more choices about what they would like to do.
>
> *Do you feel that any of the autonomy supportive behaviours are not practical?*
> - **T1:** Developing intrinsic motivation is time-consuming and more resources are needed to fully optimise it.
> - **T2:** No.
> - **T3:** They are all practical once you make a conscious effort to use them.
> - **T4:** No, they are all important for a positive learning environment.

- **T5:** The ones that require 1:1 interaction with the students as sometimes there is not enough time in the day to give this level of support. However, the pupil profiles are useful here in overcoming this and I can refer to them regularly.
- **T6:** They are difficult to use in the core subjects as the curriculum needs to be covered and as a result, they can be time consuming. More scope and flexibility to use them in the other subject areas.
- **T7:** No.
- **T8:** No. They are all practical and useful.

Is there anything else related to this area of teaching that you would find useful/helpful?

- **T1:** More video clips of the behaviours being used. I liked the ones used during the workshops.
- **T2:** More workshops and training to further explore the topic.
- **T3:** Additional sample phrases of the non-controlling language that can be used.
- **T4:** Additional sample lesson plans to see the behaviours in context.
- **T5:** I liked the practical resources and ideas so any more of these would be great.
- **T6:** Additional sample lesson plans where there are examples of good practice included (more subject specific).
- **T7:** More video clips to demonstrate how some of the behaviours can be used.
- **T8:** No.

Has this project been a good use of your time?

- **T1:** Yes.
- **T2:** Yes. It gives good "food for thought" and brings a new focus on my approach to routine activities.
- **T3:** Yes, very useful.
- **T4:** Yes, I feel that it helps you to become more reflective of your teaching.
- **T5:** Yes. It has refreshed approaches and strategies that I have not used in a while. For example, getting to know the kids and continuing to get to know them during the year.
- **T6:** Yes.
- **T7:** Yes. As the children in the class have been given more responsibility, this has allowed them to mature.
- **T8:** Yes. I enjoyed the workshops and found them beneficial for my teaching.

Is there anything that you would change about the workshops and structure of the project?

- **T1:** Running the project earlier in the school year (e.g. during term 1) when relationships and classroom routines are being developed.
- **T2:** No.
- **T3:** No.
- **T4:** No.
- **T5:** No. The project has made me reflect on my own practice.
- **T6:** No.

- **T7:** No.
- **T8:** No. The project was delivered very well.

Since commencing this project, have you noticed anything in your students that you may not have noticed before?

- **T1:** I find that more of the pupils are willing to complete and continue with their work when given rationales.
- **T2:** In getting to know the pupils more, it has been easier to relate to the weaker pupils who find that they are given more "space" and time to respond.
- **T3:** I can now see that the students in my class love choice. It makes them more motivated if they feel that have had some input and say into what they are doing.
- **T4:** They students have become more motivated as I have given them more choice in school during the day. I have also noted a reduction in incidences of negative behaviour and increased levels of participation.
- **T5:** The quieter children in the class, who may not have volunteered before, feel like they have an equal voice as a result of being given choice (e.g. how to present their learning or what subject they would like to do first).
- **T6:** The students enjoy having ownership of their learning and as a result, put more effort in.
- **T7:** I have noticed a desire in most of my students to expand their learning and to break away from the structure of textbooks.
- **T8:** I have noticed better student engagement, mood and a better classroom atmosphere. The students are excited about doing topics of interest to them in ways that they would like to explore.

Is there anything else that you would like to add?

- **T1**: No.
- **T2:** No.
- **T3:** No.
- **T4:** The resources provided during the programme are very useful.
- **T5:** A lot of what I have used in class has made the students feel older, more important and independent which they seem happy with.
- **T6:** No.
- **T7:** No.
- **T8:** Very beneficial workshops.

Step 2: Generating codes and themes.

Theme 1: Autonomy supportive instructional behaviours used by teachers (rationale). **Codes:**	**Theme 2:** Practicality of the autonomy supportive instructional behaviours. **Codes:**

Giving rationales (pupils understand more). Acknowledge negative feelings (especially with older pupils). Giving choices (listening more to the students, motivates students, gives more freedom, gets students involved). Display patience (give children a chance). Using non-controlling language. Promote intrinsic motivation.	Developing intrinsic motivation can be time-consuming and requires additional resources. Require a conscious effort to use them to effect. Those which require 1:1 interaction can be difficult to use but there are ways around this. Fitting them to prescribed curricula can be difficult (especially in the core subjects).
Theme 3: Changes observed by the teachers. **Codes:** Giving the students more responsibility has allowed them to mature. Students are more willing to participate and engage. Quieter students or those who find school difficult have been given more space and opportunity to respond. Students love being given choice. It makes them feel more motivated. Better engagement, happier mood and a more positive classroom atmosphere.	**Theme 4:** Changes to the intervention. **Codes:** Running the programme earlier in the school year (during term 1).
Theme 5: Resources used. **Codes:** More video clips to see the behaviours in use in classrooms (perhaps in the Irish context).	**Theme 6:** Use of time. **Codes:** Unanimous yes. Gives "food for thought".

Additional workshops to explore the topic further.	Brings a new focus to routine activities.
Additional sample lesson plans to demonstrate how to use the behaviours as part of teaching.	Helps to become more reflective in my practice. Has refreshed approaches and strategies not used in a while.
Any other practical resources would be beneficial.	Beneficial for my teaching.

Step 3: Reviewing and revising the themes.

On reviewing the initial themes, the following decisions were made.

1. Given the frequency of its use by teachers under Theme 1, it was decided that 'Giving choice and associated benefits' would be included as a separate theme (Theme 2) to reflect its importance as a behaviour.
2. On reviewing Theme 2 'practicality of the autonomy supportive instructional behaviours', it was decided that renaming this theme to 'barriers when using autonomy supportive behaviours' would be more appropriate and better capture the feedback from the teachers.
3. Regarding Theme 3 of 'changes observed by the teachers', it was felt that this was too broad considering the data collected. As a result, the decision was made to subdivide the theme into 'changes observed in the students' (Theme 3) and 'changes observed in the classroom atmosphere' (Theme 4).

Step 4: Write-up

The data generated from the thematic analysis to be included in the empirical paper is presented in tabular format.

Theme	Views of the teachers
1. Autonomy-supportive instructional behaviours used by teachers.	Overall, the teachers agreed on the importance and potential benefit of each of the autonomy-supportive instructional behaviours. Providing rationales was thought to "help students understand more". Acknowledging negative feelings was helpful with "older students" and in certain subject areas like "Irish". Displaying patience gave students "a chance to respond and succeed".

2. Giving choice and associated benefits.	Of all the autonomy-supportive instructional behaviours covered, teachers found the practice of giving students greater choice to be one they used most in daily classroom life. The teachers felt that this "motivated students", "gave them ownership over their learning" and "made them feel more involved".
3. Changes observed in students.	Over the duration of the study, it was evident that teachers observed changes in their students. The development of better student-teacher relationships was mentioned where the teachers felt they had "gotten to know their students more" and that students were "more willing to complete their work". Also, the teachers observed a greater desire from certain students to achieve success in their schoolwork. One teacher noted this as being especially relevant for "weaker students who are given more time and space to respond".
4. Changes observed in the classroom atmosphere.	Many of the teachers felt that the use of the autonomy-supportive instructional behaviours resulted in a more positive classroom atmosphere which had benefits for both the teacher and the students. One teacher mentioned the "reduction in incidences of negative behaviour and increased levels of participation".
5. Changes to the intervention.	In general, teachers found the intervention to be well structured and delivered in an appropriate manner. One teacher did comment that "it may be more beneficial for the intervention to be delivered earlier in the school year when student-teacher relationships are being developed and classroom routines and structures put in place".
6. Resources used.	All the teachers commented and were satisfied with the quality and practical value of the resources used as part of the ASIP. They did note that additional video clips, "perhaps in an Irish context", and more lesson plan guides would be useful in further illustrating the practicality of the autonomy-supportive behaviours. One teacher highlighted that "resources with the most practical utility in the classroom would be especially welcome".
7. Use of time.	All teachers found participation in the ASIP to be a valuable use of their time. Comments included that it gave "food for thought", "refreshed approaches and strategies", "helped me become more reflective" and "brought a new focus to routine activities".

Appendix V

Observational Data Analysis

Event Recording

Teacher:	T1	Date:	27-05-19	Time:	09:15-09:45	
Subject:	Maths					
Behaviour:	B1	B2	B3	B4	B5	B6
Observer 1 (E)	/		/	/	///	///
Observer 2 (K)	//		/	/	////	//

Teacher:	T2	Date:	27-05-19	Time:	09:45-10:15	
Subject:	Maths					
Behaviour:	B1	B2	B3	B4	B5	B6
Observer 1 (E)	///	/	//		///	/
Observer 2 (K)	//	/	//		//	//

Teacher:	T3	Date:	27-05-19	Time:	10:15-10:45	
Subject:	English					
Behaviour:	B1	B2	B3	B4	B5	B6
Observer 1 (E)	/	//	//	/	///	
Observer 2 (K)	/	//	/	/	////	/

Teacher:	T4	Date:	27-05-19	Time:	11:20-11:50	
Subject:	History					
Behaviour:	B1	B2	B3	B4	B5	B6
Observer 1 (E)	//	/	/		/	//
Observer 2 (K)	//		//	/	/	//

Teacher:	T5	Date:	28-05-19	Time:	09:15-09:45	
Subject:	Maths					
Behaviour:	B1	B2	B3	B4	B5	B6
Observer 1 (E)	//	//	//	/	///	
Observer 2 (K)	/	///	//	/	////	

Teacher:	T6	Date:	28-05-19	Time:	09:45-10:15	
Subject:	English					
Behaviour:	B1	B2	B3	B4	B5	B6
Observer 1 (E)	//	/			///	/
Observer 2 (K)	//	/			//	/

Mental Toughness and Autonomy Support

Teacher:	T7		Date:	28-05-19	Time:	10:15-10:45	
Subject:	Maths						
Behaviour:	B1	B2	B3		B4	B5	B6
Observer 1 (E)	/	/	//			//	///
Observer 2 (K)	//	/	//			/	////

Teacher:	T8		Date:	28-05-19	Time:	11.20-11.50	
Subject:	Geography						
Behaviour:	B1	B2	B3		B4	B5	B6
Observer 1 (E)		/	//		/	//	/
Observer 2 (K)		/	/		/	///	

Behaviour Key	
B1	Perspective-Taking (Choices)
B2	Promoting Intrinsic Motivation
B3	Provide Rationales
B4	Acknowledge Negativity
B5	Non-Controlling Language
B6	Display Patience

Descriptive Statistics

- Percentage of agreement between observations: 89%.
- Mean number of behaviours used per observations: 5.
- Most common behaviour used per observation: Non-controlling language.
- Least common behaviour used per observation: Acknowledging negative feelings.

Appendix W

Ethics Application Form - MIREC

Mary Immaculate College Research Ethics Committee

SECTION ONE: APPLICATION DETAILS

1.1 APPLICANT TYPE: ⃝ Faculty / Staff ◼ Student

1.2 APPLICATION TYPE: New application

1.3 If this application is a resubmission, please quote application reference number: (e.g. A16-023) | A18-059

1.4 PROJECT DURATION Proposed Start Date (Month, Year) | January 2019.

Anticipated Completion (Month, Year) | September 2020.

1.5 PROJECT TITLE:

An Investigation into the Impact of a Teacher-Based Autonomy-supportive Intervention Programme on Students' Perceptions of their Mental Toughness.

1.6 FUNDING BODY (*If any*): | N/A

1.7 NAME OF PRINCIPAL INVESTIGATOR: | Eoin Harte

1.8 OTHER INVESTIGATORS and AFFILIATIONS: |

1.9 MIC EMAIL ADDRESS: | xxxxxx

1.10 POSITION, DEPARTMENT and FACULTY (*Students should add Supervisor's Position, Department and Faculty*): | Department of Educational Psychology, Inclusive and Special Education.

1.11 ID NUMBER (*Students only*): | 11116706

1.12 PROGRAMME OF STUDY
(*Students only*):

Doctorate in Educational and Child Psychology

1.13 NAME OF SUPERVISOR
(*Students only*):

Dr Therese Brophy and Dr John Perry

NOTE: Supervisors are responsible for ensuring their students fill in this form correctly and that all ethical areas have been considered. The information in this application form is accurate to the best of my knowledge and belief, and I take full responsibility for it. I undertake to abide by the ethical principles outlined in the MIC Research Ethics Committee (MIREC) guidelines. If the research project is approved, I undertake to adhere to the study protocol without unagreed deviation, and to comply with any conditions sent out in the letter sent by MIREC notifying me of this. I undertake to inform MIREC of any changes in the protocol. I accept without reservation that it is my responsibility to ensure the implementation of the guidance of MIREC as outlined in MIREC-6.

■ Yes   ○ No

1.14 SIGNATURE OF PRINCIPAL INVESTIGATOR	DATE:
Eoin Haste	7/12/18
1.16 SIGNATURE OF CO-INVESTIGATOR(S)	

1.17 SIGNATURE OF SUPERVISOR or HEAD OF DEPARTMENT or DEAN OF FACULTY (*as appropriate*):	DATE:
Therese Brophy	7/12/18

SECTION TWO: DESCRIPTION OF RESEARCH STUDY

2.1 Purpose of research. (300 words maximum)

In building on previous research examining the place of mental toughness in education, the purpose of this proposed piece of research is to investigate the effect that autonomy support from teachers may have on the mental toughness of pupils in senior classes of Irish primary schools. In other domains, including sport and industry, individuals who encounter autonomy-supportive styles of leadership, instruction and motivation present with improved well-being and resilience and greater interest in their activities (Furtak & Kunter, 2012).

At a conceptual level, mental toughness is regarded as a collection of behaviours, attitudes and emotions that enable an individual to overcome obstacles and periods of pressure (Crust & Clough, 2011). As a concept, it encompasses elements of grit, resilience, growth mindset, tenacity and hardiness in providing the broadest conceptual understanding of what gives a person an advantage when faced with adversity (Crust & Clough, 2011). In the context of educational outcomes, higher levels of mental toughness have been associated with better attainment, improved attendance and lower levels of disruptive behaviour (St Clair-Thompson et al., 2015). This study was cross-sectional in nature and, to date, there have been no intervention-based studies to improve education related outcomes. In this regard, considering that teachers are the primary social agent for promoting the psychological needs of students, the fostering of autonomy-supportive environments and approaches to teaching, interaction and motivation has been shown to be effective in meeting these needs (Roth, Kanat-Maymon, & Bibi, 2011).

Overall, in exploring the effects of increased autonomy support by class teachers it is hoped that this piece of research will add to the evidence base around ways in which mental toughness can be developed and enhanced for young people. In particular, the potential positive role that teachers can play in this process in the course of their daily work and interactions with students will be highlighted.

2.2 Research methodology. This must detail how you will interact with your research participants (focus groups / interviews / online surveys etc.). (300 words maximum)

For the purposes of this research, once informed consent has been obtained from participants, interactions will occur with, and data will be collected from, the class teachers of senior primary classes along with the pupils in their respective classes. These interactions will occur at three stages as outlined below.

During stage one, the principal investigator will agree with each teacher to visit their class so that the pupils can complete the pre-intervention measures required from them. These include the measure of mental toughness (MTQPlus) and the pupil version of the learning climate questionnaire (LCQ). Then, the participating teachers will be invited to attend a two-hour workshop that will form the initial part of the autonomy-supportive intervention programme (ASIP) being used. This will be facilitated by the principal investigator. At this point, they will complete the teacher version of the learning climate questionnaire (LCQ) in seeing how autonomy-supportive they perceive their teaching style to be.

Stage two will take place approximately one month after stage one where the participating teachers will attend a two-hour group discussion session. The format will be like that of the workshop held during stage one and the purpose will be to share experiences and ideas of the autonomy-supportive practices that they have employed to date and discuss and address any issues arising.

Stage three will take place approximately one month after stage two where the participating teachers will again attend a two-hour group discussion session. At this stage, the focus will be on their experiences of autonomy support and structure over the last number of months. Like at stage one, the principal investigator will agree a time with each teacher where he will visit their class for the pupils to again fill out the same measures completed at the beginning of the study so that pre-intervention and post-intervention comparisons can be made.

Between each stage of the intervention the participating teachers will be updated regularly via email with literature and multi-media resources on autonomy-supportive approaches.

2.3 Sample questions. Sample questions for interviews / focus groups should be included. You may attach a separate document as part of your appendices file if necessary.

Please see appendix 8.10.3 related to the outline of the autonomy-supportive intervention programme (ASIP) being used.
Mental Toughness Questionnaire Plus (MTQPlus).
The MTQPlus is an extension of the MTQ48 (Clough et al., 2002), which has been used in over 300 peer-reviewed publications and cited almost 500 times. It has demonstrated validity and reliability in various samples (Perry et al., 2013). The extended version is part of an ongoing five-year that has currently used data from over 80,000 participants.

Example items from the questionnaire that will be used in phase one of the research is presented in appendix 8.6.

2.4 Research ethics from another HEI

Are there ethical guidelines (other than MIREC) to which you must adhere in your field of study?

◯ Yes   ⬤ No

Do you require ethical clearance from another source?

◯ Yes   ⬤ No

SECTION THREE: RESEARCH PARTICIPANTS

3.1 Explain why the use of human participants is essential to your research project.

With regards to this proposed piece of research, the use of human participants is essential as the development of mental toughness is a concept that is directly related to the cognitions, behaviours and reactions of humans. Likewise, supporting autonomy is an inter-personal approach that is rooted in the relationships and interactions between humans. In this case, the interactions between teachers at the 5th and/or 6th class level of primary school and their students will be the focus.

3.2 How will potential research participants be identified and selected? How many participants will be recruited?

Primary school teachers who are currently teaching a 5th or 6th class in an Irish primary school will be the focus of recruitment for this study. They will be identified by first contacting their school via a letter to the school principal (see attached documents). This letter will provide background information as to the purpose of the study and what action to take if they are willing to participate. A random selection of large primary schools in the geographical area of Munster will be contacted in this process.

Having contacted the principal investigator, an information letter and consent form (see attached documents) will be provided to teachers. If they are happy to continue with their participation, they will be asked to sign the consent form and return it. It is hoped to recruit sixteen teachers across four schools and their corresponding classes from this process. Once participation has been confirmed and consent forms returned the teachers in two of the schools will be assigned to the intervention group and the teachers in the other two schools will be assigned to the waitlist control group. Waitlist control groups are often used in psychological research and allow investigators to make comparisons between individuals who participate in an intervention and others who do not in judging the potential impact of the intervention. Those in the waitlist control group are then offered the intervention at a later date.

3.3 Does the proposed research necessitate the
participation of your current student cohort?

◯
Yes

■ No

If you have indicated that the proposed research necessitates the participation of students that you teach, please provide:

- A rationale as to why it is necessary that students that you teach participate in the research.

- Details of the steps you will take to ensure that participation is voluntary and that participants may withdraw at any time without consequence or fear of consequence.

You must answer this question if you intend to recruit students that you teach as research participants.

N/A

3.4 How do you plan to gain access to / contact / approach your potential participant(s)? Please also indicate the location(s) of the project.

- The first step of this process will be to write to the school principal formally informing her/him of the background of the study and what would be required from teachers interested in participating. The potential benefits and disadvantages of participating in this study will also be outlined.
- The teachers who express an interest in participating will then be provided with an information sheet to read and a consent form to complete if they agree to take part. The teachers who agree to participate will then be divided into two groups: an intervention group and a waitlist control group.
- Those teachers assigned to the intervention group will participate in each stage of the ASIP in their school organised by the principal investigator. The teachers will also be contacted during the study in order to provide them with additional resources and materials relayed to autonomy support.
- Those teachers who are assigned to the waitlist control group will only complete the pre and post intervention measures at the beginning and at the end of the study and will receive the ASIP later, on conclusion of the study. Waitlist control groups are often used in psychological research and allow investigators to make comparisons between individuals who participate in an intervention and others who do not in judging the potential impact of the intervention.
- The students of each participating teacher will also become participants once informed consent has first been sought from their parent(s)/guardian(s) followed by their own informed assent being provided. In their classroom, they will complete questionnaires at the beginning and at the end of study related to their perceived level of mental toughness and how autonomy-supportive they perceive their teacher to be.

SECTION FOUR: ETHICAL ISSUES   Answer 'Yes' or 'No' to the following questions.

HUMAN PARTICIPANTS

Does the research proposal involve?

Working with participants over 65 years of age?	○ Yes	■
Any person under the age of 18?	■ Yes	○
Adult patients?	○ Yes	■
Adults with psychological impairments?	○ Yes	■
Adults with learning difficulties?	○ Yes	■
Adults under the protection / control / influence of others (e.g. in care / prison)?	○ Yes	■ No
Relatives of ill people (parent(s)/guardian(s) of sick children)	○ Yes	■

People who may only have a basic knowledge of English?   ◯ Yes   ■

Hospital or GP patients recruited in medical facility?   ◯ Yes   ■

The use of human tissue / samples?   ◯ Yes   ■

SUBJECT MATTER

Does the research proposal involve:

Sensitive personal issues? (e.g. suicide, bereavement, gender identity, sexuality, fertility, abortion, gambling)   ◯ Yes   ■ No

Illegal activities, illicit drug taking, substance abuse or the self-reporting of criminal behaviour?   ◯ Yes   ■ No

Any act that might diminish self-respect or cause shame, embarrassment or regret?   ◯ Yes   ■ No

Research into politically and/or racially and/or ethnically and/or commercially sensitive areas?   ◯ Yes   ■ No

RESEARCH PROCEDURES

Does the research proposal involve:

Use of personal records without consent?   ◯ Yes   ■

Deception of participants?   ◯ Yes   ■

The offer of inducements or incentives to participate?   ◯ Yes   ■

Audio or visual recording without consent?   ◯ Yes   ■

Invasive physical interventions or treatments?   ◯ Yes   ■

Research that might put researchers or participants at risk?   ◯ Yes   ■

Reimbursement of participants?   ◯ Yes   ■

AREAS OTHER THAN HUMAN

Does the research proposal involve:

Use of animals?   ◯ Yes   ■

Military technology?   ◯ Yes   ■

Hazardous biological materials?   ◯ Yes   ■

Genetic modification?   ◯ Yes   ■

Nuclear reaction?   ◯ Yes   ■

Any field that may bring the College adverse attention? ◯ Yes ⬛
No

If you answered **YES** to any of the questions above, please specify why:

The involvement of persons under the age of 18 will be the 5th and/or 6th class pupils in the classes of the participating teachers. Data related to their perception of mental toughness and perceived levels of autonomy in their schooling will be gathered from them.

If you have answered **NO** to all questions, you do not need to complete Section Five. Please go to Section Six.

If you have answered YES to any question, you must fill in Section Five.

SECTION FIVE: ETHICAL IMPLICATIONS

Only fill in this section if you answered YES to ANY of the questions in Section Four

5.1 What are the ethical issues involved in your research?

The students in the classes of the participating teachers will be under the age of 18. At two timepoints during the study they will be providing data related to their perceptions of their mental toughness and how autonomy-supportive they perceive their class teacher to be. At the beginning of the study, these students will be required to obtain informed parental/guardian consent and will provide informed assent. As set out in the principle of responsibility within the PSI Code of Professional Ethics, this study will also not expose the pupils to any undue risk or harm. The students in the classes who are not participating in the study will be provided with an alternative activity to complete by their class teacher for the thirty-minute period.

Answer the following questions where relevant to your research project. You must answer at least one.

5.2 How will you ensure that vulnerable research participants are protected?
*You must answer this question if you have ticked **YES** to any question in the **Human Participants** section in Section Four.*

The students of the participating teachers in the senior primary school classes will be protected by the following measures. Firstly, an information letter will be sent to the school principal where signed permission to conduct the study will be sought. The parent(s)/guardian(s) of the potential student participants will then be provided with an information sheet. The information provided in this sheet will also allow them to make a meaningful choice regarding their child's participation. These will be given to the students in sealed envelopes to take home. An informed consent form will also be included. This will be signed and returned, in an envelope provided, by those parents who are happy for their child to participate in the study. The principal investigator will return to each class in order to collect these signed documents. Every child who returns a signed parental/guardian consent form will then be provided with a pack containing an information sheet for students and an informed assent form to complete.

During the data collection phase, when the participating students are completing the pre and post intervention measures the questions will be read aloud for the pupils. Electronic copies of the questionnaires will be made available for any students who may use assistive technology when reading and/or writing. During the data collection phase, the students will be reminded that they are free to withdraw their participation at any stage and should a student become upset at any

stage they will be offered an opportunity to talk to the principal investigator or their teacher about their concerns.

5.3 How will you protect participants if your research deals with sensitive issues?
*You must answer this question if you have ticked **YES** to any question in the **Subject Matter** section in Section Four.*

N/A.

5.4 How will you protect participants if your research deals with sensitive research procedures?
*You must answer this question if you have ticked **YES** to any question in the **Research Procedures** section in Section Four.*

N/A.

5.5 Outline how you intend to comply with any established procedures which have been approved by MIREC for your research.
*You must answer this question if you have ticked **YES** to any question in either the **Research Procedures** and/or **Areas Other Than Human** sections in Section Four.*

N/A.

5.6 Foresight

As this is a student-led piece of research, it is not foreseen that the principal investigator will change institutional affiliation during this research project.

5.7 Risk Assessment. Please describe the steps taken to minimise risk.

In minimising risk, the following steps will be taken…
- The principal investigator will be in constant communication with his research supervisors at each stage of the research process. In this manner, all procedures will be monitored during the study by the principal investigator in conjunction with his supervisors.
- The acquiring of informed consent at the beginning of the study will ensure that participants are aware of what involvement in the study entails and that they are free to withdraw their participation at any time.
- The autonomy-supportive intervention programme (ASIP) being used is closely based on those that have been used in previous research and on the exiting literature on effective ASIPs.

SECTION SIX: INFORMATION, CONSENT AND CONFIDENTIALITY

6.1 INFORMATION LETTER FOR PARTICIPANTS
You must submit an information letter for participants with this application as part of your appendices. Sample letters can be found can be found <u>here</u> (MIREC-2: Guidelines for Completing Research Ethics Committee Application Form MIREC-3, Appendix 1).

Please confirm below that your information letter covers:

Description of the research topic and method	■ Yes	○ No
Details of what participation will involve	■ Yes	○ No
Rights to anonymity	■ Yes	○ No
Rights to withdraw from the research	■ Yes	○ No
Contact details of the Principal Investigator, Supervisor and MIREC	■ Yes	○ No

6.2 CONSENT
Informed consent is required for all human participant research. Signed consent is not required for online surveys since completing the survey implies consent of participants. In all other research a signed consent form is required. Sample forms can be found <u>here</u> (MIREC-2: Guidelines for Completing Research Ethics Committee Application Form MIREC-3, Appendix 2).

Please indicate below if your research requires a signed consent form

YES, my research requires signed consent and I have attached a completed consent form in the appendices of my application.   ■

NO, my research study involves an online survey only and does not require signed consent   ○

6.3 How will you ensure that informed consent is freely given by participants?

Firstly, an information letter will be sent to the school principal where signed permission to conduct the study will be sought.

Then, the teachers who express an interest in participating in the study will be provided with an information sheet that will give them sufficient and appropriate information about the research. This will allow them to make a meaningful choice about whether to take part of not. The information will be presented in an accessible and comprehensive format and participants will have the opportunity to ask the investigator questions. Having read this document, they will be provided with a consent form to complete.

Similarly, for the potential student participants, their parent(s)/guardian(s) will first be provided with an information sheet. The information provided in this sheet will also allow them to make a meaningful choice regarding their child's participation. These will be given to the students in sealed envelopes to take home. An informed consent form will also be included. This will be signed and returned, in an envelope provided, by those parents who are happy for their child to participate in the study. The principal investigator will return to each class in order to collect these signed documents. Every child who returns a signed parental/guardian consent form will then be provided with a pack containing an information sheet for students and an informed assent form to complete.

6.4 Anonymity and Confidentiality

What arrangements have you made for anonymity or confidentiality (*if appropriate*)?

All data collected from the teachers and the pupils in their classes will be anonymised by being given a unique identifier. The data will never be stored with the sheets of the unique identifiers and corresponding names. All the data will be encrypted and stored on password protected computers.

SECTION SEVEN: STORAGE OF MATERIALS

7.1 How do you propose to store / retrieve the information? Who will have custody of, and access to, the data? How will you manage data protection issues?

All data storage will comply with the Data Protection Acts of 1998 and 2003. The principal investigator (Eoin Harte) and his research supervisors (Dr. Therese Brophy and Dr. John Perry) will only have access to the data collected. Outside the scope of the research project, the data will only be used for presenting findings at relevant conferences and in the process of publishing the study. Participants will not have access to their data during the study. All the data collected will be stored on the password protected laptop of the principal investigator. The hard copies of the questionnaires will be stored in a locked filing cabinet at the home address of the principal investigator.

7.2 I have read the MIC Record Retention Schedule and the MIC Data Protection Policy & Procedures document have made arrangements to comply by them. ■ Yes

SECTION EIGHT: DOCUMENT CHECKLIST

NOTE: Applicants must create a single electronic document to include all appendices. Multiple files will not be accepted

Which documents are attached? Please tick N/A if not applicable:

8.1 Information letter for participant — ■ Yes ○ N/A

8.2 Consent form for participant — ■ Yes ○ N/A

8.3 Information letter for parent / guardian — ■ Yes ○ N/A

8.4 Consent form for parent / guardian — ■ Yes ○ N/A

8.5 Letter to school principal — ■ Yes ○ N/A

8.6 Questions / survey for interviewees / focus groups etc. — ■ Yes ○ N/A

8.7 Recruitment letter / email / poster — ○ Yes ■ N/A

8.8 Confirmation of Garda Vetting (See Guidelines and here for more details) — ■ Yes ○ N/A

8.9 Child Protection form (See Guidelines for more details) — ○ Yes ■ N/A

8.10 Other document(s) - please specify below: — ■ Yes ○ N/A

8.10.1: Information Sheet for Students.

Mental Toughness and Autonomy Support

Appendix X

Ethical Approval – MIREC

Mary Immaculate College Research Ethics Committee

MIREC-4: MIREC Chair Decision Form

APPLICATION NUMBER: | A18-059 FINAL

1. PROJECT TITLE

An Investigation into the Impact of a Teacher-Based Autonomy Supportive Intervention Programme on Students' Perceptions of their Mental Toughness.

2. APPLICANT

Name:	Eoin Harte
Department / Centre / Other:	Educational Psychology, Inclusive & Special Education
Position:	Postgraduate Researcher

3. DECISION OF MIREC CHAIR

	Ethical clearance through MIREC is required.
	Ethical clearance through MIREC is not required and therefore the researcher need take no further action in this regard.
✓	Ethical clearance is required and granted. Referral to MIREC is not necessary.
	Ethical clearance is required but the full MIREC process is not. Ethical clearance is therefore granted if required for external funding applications and the researcher need take no further action in this regard.
	Insufficient information provided by applicant / Amendments required.

A18-059 - Eoin Harte - *An Investigation into the Impact of a Teacher-Based Autonomy Supportive Intervention Programme on Students' Perceptions of their Mental Toughness*

I have reviewed this application and I believe it satisfies MIREC requirements and is therefore approved.

4. DECLARATION (MIREC CHAIR)

Name (Print):	Dr Áine Lawlor
Signature:	*Áine Lawlor*
Date:	30th January 2019

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Appendix Y

Ethics Application Form – NEPS

NEPS Research Approval Form   Non NEPS Personnel

Title of project: An Investigation into the Impact of a Teacher-Delivered Autonomy-supportive Intervention Programme on Student's Perceptions of their Mental Toughness.

Name of researcher(s): Eoin Harte.

Date: February 11th, 2019.

Name of Supervisors: Dr. Therese Brophy and Dr. John Perry (both Mary Immaculate College, Limerick).

Purpose and rationale of project and relevance to NEPS:

In building on previous research examining the place of mental toughness in education, the purpose of this research is to investigate the effect that autonomy support from teachers may have on the mental toughness of pupils in senior classes of Irish primary schools. In other domains, including sport and industry, individuals who encounter autonomy-supportive styles of leadership, instruction and motivation present with improved well-being and resilience and greater interest in their activities (Furtak & Kunter, 2012).

At a conceptual level, mental toughness is regarded as a collection of behaviours, attitudes and emotions that enable an individual to overcome obstacles and periods of pressure (Crust & Clough, 2011). As a concept, it encompasses elements of grit, resilience, growth mindset, tenacity and hardiness in providing the broadest conceptual understanding of what gives a person an advantage when faced with adversity (Crust & Clough, 2011). In the context of educational outcomes, higher levels of mental toughness have been associated with better attainment, improved attendance and lower levels of disruptive behaviour (St Clair-Thompson et al., 2015). In this regard, considering that teachers are the primary social agent for promoting the psychological needs of students, the fostering of autonomy-supportive environments and approaches to teaching, interaction and motivation has been shown to be effective in meeting these needs (Roth, Kanat-Maymon, & Bibi, 2011).

Overall, in exploring the effects of increased autonomy support by class teachers it is hoped that this piece of research will add to the evidence base around ways in which mental toughness can be developed and enhanced for young people. In particular, the potential positive role that teachers can play in this process in the course of their daily work and interactions with students will be highlighted. In this regard, considering that one of the current NEPS research directions is mental health a research project of this

kind would appear to fit where a way in which students can fostered to become more mentally tough is being explored.

Brief description of methods and measurements:

For the purposes of this research, once informed consent has been obtained from participants, interactions will occur with, and data will be collected from, the class teachers of senior primary classes along with the pupils in their respective classes. These interactions will occur at three stages.

During stage one, the investigator will agree with each teacher to visit their class so that the pupils can complete the pre-intervention measures required from them. These include the measure of mental toughness (MTQPlus) and the pupil version of the learning climate questionnaire (LCQ). Then, the participating teachers will be invited to attend a workshop that will form the initial part of the autonomy-supportive intervention programme (ASIP) being used. This will be facilitated by the principal investigator in the teacher's school. At this point, they will complete the teacher version of the learning climate questionnaire (LCQ) in seeing how autonomy-supportive they perceive their teaching style to be.

Stage two will take place approximately one month after stage one where the participating teachers will attend another workshop/group discussion session. The format will be like that of the workshop held during stage one and the purpose will be to share experiences and ideas of the autonomy-supportive practices that they have employed to date and discuss and address any issues arising.

Stage three will take place approximately one month after stage two where the participating teachers will again attend a workshop/group discussion session. At this stage, the focus will be on their experiences of autonomy support and structure over the last number of months. Like at stage one, the principal investigator will agree a time with each teacher where he will visit their class for the pupils to again fill out the same measures completed at the beginning of the study so that pre-intervention and post-intervention comparisons can be made.

Between each stage of the intervention the participating teachers will be updated regularly via email with literature and multi-media resources on autonomy-supportive approaches.

Participants: recruitment methods, number, age, gender, inclusion/exclusion criteria

Primary school teachers who are currently teaching a 5th or 6th class in an Irish primary school will be the focus of recruitment for this study. They will be identified by first contacting their school via a letter to the school principal. This letter will provide background information as to the purpose of the study and what action to take if they

are willing to participate. Larger primary schools with at least a total of 4 fifth and sixth classes located within proximity to the investigator will be used.

Having contacted the principal investigator, an information letter and consent form will be provided to teachers. If they are happy to continue with their participation, they will be asked to sign the consent form and return it. It is hoped to recruit sixteen teachers across four schools and their corresponding classes from this process. Once participation has been confirmed and consent forms returned the teachers in two of the schools will be assigned to the intervention group and the teachers in the other two schools will be assigned to the waitlist control group. Waitlist control groups are often used in psychological research and allow investigators to make comparisons between individuals who participate in an intervention and others who do not in judging the potential impact of the intervention. Those in the waitlist control group are then offered the intervention at a later date.

Consent and participant information arrangements, debriefing

Firstly, an information letter will be sent to the school principal where signed permission to conduct the study will be sought.

Then, the teachers who express an interest in participating in the study will be provided with an information sheet that will give them sufficient and appropriate information about the research. This will allow them to make a meaningful choice about whether to take part of not. The information will be presented in an accessible and comprehensive format and participants will have the opportunity to ask the investigator questions. Having read this document, they will be provided with a consent form to complete.

Similarly, for the potential student participants, their parent(s)/guardian(s) will first be provided with an information sheet. The information provided in this sheet will also allow them to make a meaningful choice regarding their child's participation. These will be given to the students in sealed envelopes to take home. An informed consent form will also be included. This will be signed and returned, in an envelope provided, by those parents who are happy for their child to participate in the study. The principal investigator will return to each class in order to collect these signed documents. Every child who returns a signed parental/guardian consent form will then be provided with a pack containing an information sheet for students and an informed assent form to complete.

	Yes	No
Is your research in line with NEPS key Research Directions for 2011–2016	✓	

	Yes	*No*	*Does not apply*
Has your research proposal received ethical approval by a University or college?	✓		
Will you describe the main experimental procedure to participants in advance, so that they are informed about what to expect?	✓		
Will you tell participants that their participation is voluntary?	✓		
Will you obtain written consent for participation?	✓		
If the research is observational, will you ask participants for their consent to being observed?			✓
Will you tell participants that they may withdraw from the research at any time and for any reason?	✓		
If you are using a questionnaire, will you give participants the option of omitting questions they do not wish to answer?	✓		
Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	✓		
Will you debrief participants at the end of their participation?	✓		
Do you agree to have your abstract, if your proposal is approved, openly available to NEPS colleagues?	✓		
Do you agree to have a summary of your completed research, if your proposal is approved, openly available to NEPS colleagues?	✓		
If you have ticked NO to any of the above questions, please give an explanation on a separate sheet			
Will your project involve deliberately misleading participants in any way?		✓	
Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? If yes, please give details on a separate sheet and state what you will tell them		✓	

to do if they should experience any problems (e.g. who they can contact for help).			
Do you consider that this research has any significant ethical implication not covered by the questions above?		✓	

If you have ticked YES to any of the above questions, please give an explanation on a separate sheet

Considerations	
In line with NEPS key Research Directions for 2011 – 2016.	This proposed research project falls within the area of Mental Health.
Relevance/value to NEPS.	This research project could potentially identify a way in which teachers can be supported and trained to foster greater mental toughness in students that could lead to improved overall mental health outcomes and other positive effects (improved attainment, performance, attendance).
NEPS Staff Time involved	None.
Costs (financial)	None.
Duration (including proposed starting date)	4 months. March to June 2019 (inclusive).
Ethical standards applied	All stages of the proposed project comply with the Code of Ethics as set out by the PSI and adhere to the ethical standards of the Mary Immaculate Research Ethics Committee (MIREC).
Intention to publish/present at conference	It is hoped that on completion of this project it would be published in a suitable journal (e.g. Educational Psychology in Practice) and a summary of the findings would be presented at a relevant conference (e.g. PSI annual conference).
Supervision (University etc.)	This research project is under the supervision of Dr. Therese Brophy and

	Dr. John Perry at Mary Immaculate College, Limerick.

I declare the above to be true. I am familiar with the PSI Code of Professional Ethics and I agree to abide by it.

Signed: *Eoin Harte*   **Print name:** Eoin Harte   **Date:** 11/02/2019

Please complete Research Disclaimer overleaf.

NEPS RESEARCH DISCLAIMER

I Eoin Harte intend to undertake research entitled 'An Investigation into the Impact of a Teacher-Delivered Autonomy-supportive Intervention Programme on Student's Perceptions of their Mental Toughness' during the period January 2019 to September 2020. I am being supervised by Dr. Therese Brophy and Dr. John Perry in Mary Immaculate College. During this time, I will conduct my research involving NEPS personnel using questionnaires with teachers and students and a workshop style intervention with teachers.

I acknowledge that the responses I may obtain will consist of the views of individual psychologists in relation to the research questions being asked. I acknowledge that the responses I may obtain are not representative of the view of NEPS as an organisation.

I agree that a statement to verify this fact must be included in my research report and any other documentation connected with my research and at any reporting of the research at conferences, seminars, symposia etc. I also agree that my supervisor will guarantee that a summary of the research once completed will be forwarded to the NEPS Research Advisory Committee In addition I guarantee that a copy of any report of this research to be published will be forwarded to the NEPS Research Advisory Committee before its publication.

Signed: *Eoin Harte*   **(Eoin Harte)**   **Date:** 11/02/2019.

Signed: *Therese Brophy*   **(Dr. Therese Brophy)**   **Date:** 13/02/2019.

Signed: **(Dr. John Perry)**   **Date:** 13/02/2019.

Date sent to NEPS RAC: 13/02/2019.   Date received in NEPS RAC:

Appendix Z

Ethical Approval – NEPS

Dear Eoin,

I am pleased to tell you that your research proposal titled '*An Investigation into the Impact of a Teacher-Delivered Autonomy Supportive Intervention Programme on Student's Perceptions of their Mental Toughness.* ' has been approved by NEPS and all staff will be notified shortly . Well done.

If you need any further assistance please feel free to contact me as required.

Best wishes,

Feargal