

The impact of non-cognitive skills on outcomes for young people

Literature review

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We aim to raise the attainment of children facing disadvantage by:

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- Evaluating these innovations to extend and secure the evidence on what works and can be made to work at scale;
- Encouraging schools, government, charities, and others to apply evidence and adopt innovations found to be effective.

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Executive summary

The term 'non-cognitive skills' refers to a set of attitudes, behaviours, and strategies that are thought to underpin success in school and at work, such as motivation, perseverance, and self-control. They are usually contrasted with the 'hard skills' of cognitive ability in areas such as literacy and numeracy, which are measured by academic tests. Non-cognitive skills are increasingly considered to be as important as—or even more important than—cognitive skills or IQ in determining academic and employment outcomes. Indeed, there is now growing attention from policymakers on how such 'character' or 'soft' skills can be developed in children and young people.

However, despite growing interest in this topic, the causal relationship between non-cognitive skills and later outcomes is not well established. This rapid literature review is intended to summarise the existing evidence on how 'non-cognitive skills' can be defined and measured; assess the evidence that such skills have a causal impact on later outcomes; and the role of select interventions that aim to improve non-cognitive skills in children and young people. It has been jointly funded by the Education Endowment Foundation and Cabinet Office to inform future work in this area.

Key Findings

There are signs of promise that non-cognitive skills have an impact on positive outcomes for young people, but causal evidence of impact on long-term outcomes is so far limited:

- Non-cognitive skills are associated with positive outcomes for young people, according to a large body of research. Factors such as self-control and school engagement are correlated with academic outcomes, financial stability in adulthood, and reduced crime.
- However, robust evidence of a causal relationship is limited. Less is known about how far it is possible to develop a young person's non-cognitive skills through intervention, or whether such changes lead to improved outcomes, especially in the long-term, e.g., employment.
- There is no single non-cognitive skill that predicts long-term outcomes. Rather key skills are inter-related and need to be developed in combination with each other.

Evidence is strongest in relation to skills underpinning academic outcomes:

- Children's perception of their ability, their expectations of future success, and the extent to which they value an activity influence their motivation and persistence leading to improved academic outcomes, especially for low-attaining pupils.
- Within school, effective teaching, the school environment, and social and emotional learning programmes (SEL) can play an important role in developing key non-cognitive skills.
- Outside of school, evidence from intervention studies suggests that programmes such as 'service learning' and outdoor challenging activities have low to medium effects on a variety of cognitive and non-cognitive outcomes. However, most of this evidence is from the US.

There are areas where further research is needed:

- Leadership, coping skills, and pupils' engagement with school can be promoted in young people, but there is no experimental evidence yet that their improvement has a substantial causal effect on other outcomes.
- Some non-cognitive skills including 'grit' and self-control correlate strongly with outcomes but appear to be more akin to stable personality traits rather than to malleable skills.
- There are gaps in the evidence because many studies define and measure non-cognitive skills in disparate ways, assess them in isolation, and focus on short-term outcomes. Priorities for future research should be to explore how skills can be transferred between areas of a young person's life, and how far changes can be sustained in the long term.

Contents

- 1. Introduction..... 4
- 2. Methods..... 6
- 3. Non-Cognitive Skills..... 7
 - 3.1 Self-Perceptions..... 9
 - 3.2 Motivation 12
 - 3.3 Perseverance..... 17
 - 3.4 Self-Control 20
 - 3.5 Metacognitive Strategies..... 22
 - 3.6 Social Competencies 24
 - 3.7 Resilience and Coping 27
 - 3.8 Creativity 29
- 4. Interventions 31
 - 4.1 Mentoring Programmes..... 32
 - 4.2 Service Learning Programmes 34
 - 4.3 Outdoor Adventure Programmes 36
 - 4.4 Social and Emotional Learning Programmes..... 38
- 5. Summary and Conclusions 40
- 6. References 44
- Appendix 57

1. Introduction

“Numerous instances can be cited of people with high IQs who fail to achieve success in life because they lacked self-discipline and of people with low IQs who succeeded by virtue of persistence, reliability and self-discipline”

Heckman & Rubinstein (2001): The importance of non-cognitive skills. *The American Economic Review*, 91, 145-149

Non-cognitive skills are those attitudes, behaviours, and strategies which facilitate success in school and workplace, such as motivation, perseverance, and self-control. These factors are termed ‘non-cognitive’ as they are considered to be distinct from the cognitive and academic skills usually measured by tests or teacher assessments.

Non-cognitive skills are increasingly considered to be as important as—or even more important than—cognitive skills and IQ in determining academic and employment outcomes. Indeed, there is now growing attention from policymakers on how such ‘character’ or ‘soft’ skills can be developed in children and young people.

In a wide range of studies from a variety of disciplines, researchers have established an association between non-cognitive skills and academic outcomes (**Bowles & Gintis, 2002; Farkas, 2003; Heckman et al., 2006; Jencks, 1979; Lleras, 2008**). Furthermore, these researchers have suggested that investing in the development of these non-cognitive factors would yield high returns in future educational and employment outcomes, and help close the attainment gap between advantaged and disadvantaged young people (e.g., **Heckman et al., 2006**).

However, despite increasing evidence that non-cognitive skills are strongly correlated with success, the evidence seems to be less clear that there is a causal, robustly measurable relationship between such factors and positive outcomes; that it is possible to increase these factors through intervention; and what works in doing this.

Gaps in the Evidence Base

There are still significant gaps in the evidence base.

1. There is little consensus on whether the relationship between non-cognitive skills and later outcomes is a causal one. This is because most studies have used correlational data. More research is required which employs rigorous experimental methods.
2. There is little understanding regarding the extent to which non-cognitive skills are ‘malleable’ (i.e., ‘changeable’), indicating that they can be taught to children and young people. Interventions which encourage non-cognitive attributes and skills may be effective, yet few studies have assessed their long-term impact.
3. There is little agreement about how non-cognitive skills should be defined and measured. There are standardised test instruments to assess cognitive and academic abilities as well as a variety of ‘non-cognitive’ skills, yet there is not one single measure of non-cognitive skills.
4. Many of the non-cognitive factors are inter-linked, yet most studies examine non-cognitive skills in isolation. There is no conclusive evidence which of the diverse characteristics is the one crucial ‘silver bullet’ to improve or facilitate attainment across all domains, and it is unlikely that such a characteristic can be found.

The purpose of this report

The main purpose of this rapid review is to understand the current evidence base and identify areas of promise, in order to inform future work in this area. It has been jointly funded by the Education Endowment Foundation (EEF) and the Cabinet Office. The EEF is particularly interested in the role of non-cognitive skills in narrowing the gap in outcomes for pupils from disadvantaged backgrounds. The Cabinet Office is particularly interested in the role of non-cognitive skills in the context of ‘social action’ interventions for young people. Social action is defined as “young people doing practical action in the service of others, in order to create positive social change that is of benefit to the wider community as well as to the young person themselves”.

This review first examines the extent to which non-cognitive skills matter for various outcomes and how to robustly measure those skills. It then focuses on the role of programmes and interventions that develop non-cognitive skills for children and young people.

Research Aims

This review has four aims:

1. To provide a definition of key ‘non-cognitive’ skills and assess how they are measured.
2. To examine the evidence on different non-cognitive skills and assess how far non-cognitive skills lead to (a) improved educational attainment and (b) better longer-term outcomes. The review focuses on high-quality research highlighting the role of experimental or quasi-experimental studies. It considers the strengths and limitations of the available causal evidence.
3. To discuss interventions that show evidence of a causal impact on educational attainment or longer term outcomes as a result of improving non-cognitive skills. The review focuses on programmes for school-age children and adolescents, highlighting social action activities such as community volunteering, and assesses the strength of the causal relationship established .
4. To identify which non-cognitive skills provide the greatest areas of promise for future work. The review considers whether the most important non-cognitive ability may vary according to outcome of interest, as well as the age and/or gender of the young person and how this might influence the timing and target of the intervention strategy.

2. Methods

In this review, we examine experimental or quasi-experimental studies where at least one non-cognitive skill is a predictor of outcomes. We also assess studies of interventions which are aimed at developing or enhancing one or more non-cognitive skills for the purpose of improving educational and other positive outcomes. The outcomes we consider include: educational attainment, employment, health, well-being, engagement, employability, civic participation, and voting.

In order to review the literature, we first scan a number of databases such as Science Direct, PsychInfo, Springerlink, ERIC, and Google Scholar, focusing on English-language studies. We primarily search for quasi-experimental and experimental studies published from 1995 through 2013. We limit our search to research focused on skills of school-age children and adolescents. Studies examining post-secondary outcomes are included if non-cognitive factors are predictors and measured while participants were still enrolled in education. We exclude studies where the non-cognitive skill was measured as an outcome rather than a predictor, or if the studies focused on adults.

It is important to note that our review is not an exhaustive one. When there are meta-analyses of experimental research available for specific non-cognitive skills, we focus on the findings of these meta-analytic studies. When there are no meta-analyses available, then we review individual experimental studies, when available. For programmes and interventions, we present evaluations which have been published as peer-reviewed journal articles. We therefore do not include more locally-based interventions which have not been rigorously evaluated. For the interventions, we focus on meta-analytic findings, including their effect size. We also review a few studies of key interventions in more depth.

Quality of evidence

In order to assess the quality of the studies, we employ the Maryland Scientific Method Scale (SMS) (Sherman, 1997). The SMS is used to evaluate the methodological quality of intervention studies and the authors indicate that results at Level 5 are the highest, and Level 3 is the minimum to achieve reasonably accurate findings. In reviewing previous studies, we distinguish experimental studies which include random assignment of control and experimental groups (Level 5) from quasi-experimental studies which do not use random assignment with multiple experimental and control groups (Level 4) or one experimental and one control group (Level 3). Interventions which have measures of a pre-and post-treatment score, with no control group are delineated at Level 2. Intervention studies which examine an association between attendance in the programme at one point in time of measurement are considered to be Level 1. Therefore, our use of the term “experimental” alludes only to those studies which use random assignment of a control and treatment group. We refer to studies which use control and experimental groups without random assignment as “quasi-experimental”. We review interventions considered to be Level 2, but we note that there is only pre- and post-treatment measures without a control group.

Effect sizes

In this report, we include the effect size, whenever available. The effect size, Cohen's d , is the standardised mean difference between two groups, such as treatment and control groups. For example, an effect size of .25 would represent a difference of one-quarter of a standard deviation on the outcome measure. Guidelines have been suggested for what can be considered a small (.20), medium (.50), or large (.80) effect size (Cohen, 1988). In some cases, the average correlation, Pearson's r , is reported. Cohen also provides the following guidelines for the Pearson's r , where .10 is small, .30 is medium and .50 is large. The routine use of effect sizes has generally been limited to meta-analysis for combining and comparing estimates from different studies and is rarely reported in original research. Combining findings across studies using meta-analysis can yield more reliable and precise estimates of programme impact than is possible for any individual study examined in isolation (Lipsey & Wilson, 2001). When there are no meta-analytic studies available, we calculate effect sizes from experimental studies, whenever means and SD are reported. Such instances will be noted in the text.

3. Non-Cognitive Skills

Background

The term “non-cognitive skills” is used to contrast a variety of behaviours, personality characteristics, and attitudes with academic skills, aptitudes, and attainment. The concept was introduced by sociologists Bowles and Gintis (1976) to focus on factors other than those measured by cognitive test scores. They highlighted the role of attitudes, motivation and personality traits, rather than academic skills, as determinants of labour market success. Their findings have been reinforced by more recent studies, which have demonstrated the significant role of non-cognitive skills (i.e., attitudes, motivation and personal characteristics) over and above cognitive skills in shaping labour market outcomes, social behaviour and health (Farkas, 2003, Heckman et al., 2006).

The term ‘non-cognitive’, however, creates a false dichotomy between cognitive abilities and what are often seen as psychosocial or soft skills (Farrington et al., 2012). It is confusing to contrast cognitive and non-cognitive factors as “few aspects of human behaviour are devoid of cognition” (Borghans, Duckworth, Heckman, & ter Weel, 2008, p. 974). In the following report, we continue to use the term “non-cognitive skills” to maintain consistency with previous researchers. However, it is important to note that discussion of non-cognitive skills is complicated and contested. There is little agreement even on whether ‘non-cognitive skills’ is the right way to describe the set of issues under discussion, and terms such as ‘character skills’, ‘competencies’, ‘personality traits’, ‘soft skills’ and ‘life skills’ are also widely used.

Our Scope

The category of ‘non-cognitive skills’ can include a very broad range of characteristics including motivation, confidence, tenacity, trustworthiness, perseverance, and social and communication skills. Each of these factors has a long and distinct history of theoretical and methodological approaches, and different instruments exist to assess them. In this review, we differentiate between relatively stable characteristics, such as personality traits, and more flexible and modifiable characteristics, such as self-perceptions, motivation, and social competencies.

It is argued that there are the “Big Five” personality traits which include Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (also called Emotional Stability). A convenient acronym for these factors is OCEAN. While personality traits are important in shaping individual choices and attainments, they are considered to be less malleable than other more flexible characteristics.

Since this review aims to identify key competencies that can be modified, we focus on more flexible, malleable characteristics which have been linked to positive outcomes for children and adolescents. Therefore, we examine eight factors which we have identified as potential key non-cognitive skills of children and young people. Our list includes:

1. Self-Perceptions
2. Motivation
3. Perseverance
4. Self-Control
5. Metacognitive Strategies
6. Social Competencies
7. Resilience and Coping
8. Creativity

Approach

In the next section of the report, we discuss each of these non-cognitive skills in turn. For each skills, we first provide a clear **definition**. We then focus on its **measurement** and include one or two key measures for children and/or adolescents. We next provide a summary of the **correlational evidence**, which indicates an association between the non-cognitive skill and other outcomes but does not suggest causality. We then examine whether there is evidence of **malleability**, which indicates that the non-cognitive skill can be taught or improved. Next, we focus on **causal evidence** from quasi-experimental and experimental studies. Lastly, we offer a **conclusion**, discussing the strengths and weaknesses of the non-cognitive skill as a causal factor.

3.1 Self-Perceptions

Self-perceptions are an individual's own beliefs about whether or not they can accomplish a task. Self-perceptions are often seen as precursors to motivation: if a child believes in their ability, they are likely to be more motivated and put forth greater effort, leading to improved performance. The main theoretical approaches concerning self-perceptions are **self-concept of ability** (Harter, 1982; Marsh & Shavelson, 1985; O'Mara et al., 2006; Valentine et al., 2004) and **self-efficacy** (Bandura, 1977; Bandura, 2001). These concepts differ both conceptually and psychologically from each other. In principle, self-concept of ability evaluates how an individual has felt about general past performance, while self-efficacy measures expectations about performing specific tasks in the future. This chapter examines these two concepts in turn.

3.1.1 Self-Concept of Ability

Definition

Self-concept of ability, broadly defined, can be thought of as an individual's self-perception of their ability formed through experiences and interactions with the environment (O'Mara et al., 2006; Valentine et al., 2004). Global self-concept of ability concerns how individuals feel about themselves more generally, while domain-specific self-concept concerns their perceptions in a single area. For example, academic self-concept is a student's perception of his or her general ability in school.

Measurement

There are several well-known survey instruments that are widely used to measure self-concept. For global self-concept of ability, there is the Self-Description Questionnaire (SDQ) (Marsh, 1990; 1992) and the Self-Perception Profile for Children/for Adolescents (SPP-C and SPP-A) (Harter, 1985; 1988). From these instruments, the more scholastically focused Academic Self-Description Questionnaire (ASDQ) was developed for use in school-aged child populations (see Marsh, 1990; Byrne, 1996). The ASDQ is a multidimensional (i.e., more than one academic domain) self-concept instrument based on prior SDQ research. A review of the psychometric properties of the ASDQ can be found in Byrne (1996).

Correlational Evidence

There is a wealth of correlational research examining self-concept. The vast majority of this research has focused on academic self-concept. This shows that higher levels of academic self-concept are associated with higher levels of achievement (Denissen et al., 2007; Marsh & Craven, 1997). In their meta-analysis, for example, Hanson and Hattie (1982) reported the average correlation between global self-concept and academic achievement was .21, while the average correlation between academic self-concept and achievement was noticeably higher at .42. This indicates that there is a positive relationship between self-concept and achievement and that the association is much higher when it is domain-specific. Nevertheless, this research does not reveal the direction of this association (i.e., whether self-concept of ability predicts achievement or vice versa).

Malleability

There have been numerous interventions that have shown improvements in children's and adolescent's self-concept. In their meta-analysis, Haney and Durlak (1998) found that programmes which specifically focused on self-concept enhancement were effective in improving self-concept of ability. The mean effect size from pre-test to post-test was .57. Another recent meta-analysis of interventions aimed at children up to age 18 found similar results (O'Mara, Marsh, Craven, & Debus, 2006). The mean effect size for intervention studies which focused on enhancing self-concept from pre- to post-intervention was .67. Together, these analyses show that self-concept of ability is malleable for school-age populations.

Causal Evidence

While research indicates that prior academic self-concept has an association with subsequent achievement, there is little evidence that this is a causal relationship. One of the main reasons is that most of the research relies on longitudinal panel data. As a result, the causal ordering is questionable. Furthermore, academic self-concept is formed and developed through interactions with a student's significant others (i.e., parents, teachers, or peers);

and therefore, considered to be dynamic as a student progresses through schooling. In a series of studies, Marsh and colleagues (see Marsh and Craven, 2006) investigated the causal ordering of self-concept and achievement, concluding that evidence exists for reciprocal effects—pupils that believe in their ability are likely to improve their performance, and those that improve their performance are likely to have belief in their ability. Consequently, Marsh and colleagues argue that researchers and practitioners should aim simultaneously to improve both academic self-concept and academic skills. Therefore, interventions which enhance self-concepts without improving performance will likely show short-lived gains in self-concept. Conversely, interventions which improve performance without also fostering participants' self-beliefs in their capabilities will be unlikely to have performance gains which are long-lasting.

Conclusion

While there is overwhelming evidence of a positive relationship between self-concept and related outcomes, there is little empirical evidence of a causal one. While intervention studies have shown that self-concept can be enhanced, there is a dearth of experimental studies which have manipulated self-concept and then measured its subsequent effect on later outcomes. Therefore, while self-concept might be a useful measure to determine how one's perception of their own ability changes in regard to an intervention, it is not likely to be a factor which can be manipulated to predict change in other outcomes.

3.1.2 Self-Efficacy

Definition

Self-efficacy is an individual's belief that they have the capability to succeed at a particular task in the future (Bandura, 1977, 2001). Whereas self-concept of ability assesses how an individual feels about their past performance in relation to others, self-efficacy measures an individual's expectations about whether or not they can successfully perform a specific task at a later point in time. In practice, self-efficacy focuses on the successfully mastering of a specific task, while self-concept of ability is concerned with the affective appraisal of one's performance in an academic domain, relative to others.

Measurement

There have been several different scales used to measure self-efficacy. For a comprehensive instrument, the Motivated Strategies for Learning Questionnaire (MSLQ) has proven reliability and validity. The MSLQ is an 81-item, self-report instrument consisting of 6 motivation subscales and 9 learning strategies scales (Pintrich, Smith, García, & McKeachie, 1993). The motivation scales tap into three broad areas: (1) intrinsic and extrinsic goal orientation, task value, (2) expectancy (control beliefs about learning, self-efficacy); and (3) affect (test anxiety). Scale reliabilities are robust, and confirmatory factor analyses demonstrates good factor structure.

The MSLQ has proven to be a useful tool that can be adapted for a number of different purposes for researchers, instructors, and students (Duncan & McKeachie, 2005). The MSLQ has been translated into multiple languages and has been used by hundreds of researchers and instructors throughout the world. For a shorter measure with acceptable reliability, the Students' Approaches to Learning (SAL) instrument was evaluated among approximately 4,000 15-year-olds from each of 25 countries (Marsh et al., 2006). The instrument examines 14 different factors, one of which is perceived self-efficacy. The short scale includes only four items asking students about their confidence in their ability to do well on academic tasks.

Correlational Evidence

Correlational studies have shown that self-efficacy is associated with positive outcomes including psychosocial functioning in children and adolescents (Holden, Moncher, Schinke, & Barker, 1990), better health behaviours (Holden, 1992), and higher academic achievement and greater persistence (Multon, Brown, & Lent; 1991; Richardson, Abraham, & Bond, 2012).

Malleability

There are several experimental studies which demonstrate that self-efficacy can be improved. Most of these experimental studies were conducted in the 1980s (e.g., Bandura & Schunk, 1981; Schunk, 1981; 1982; 1983; 1984; 1985; Schunk & Hanson, 1985; Schunk, Hanson, & Cox, 1987). Although these studies did not calculate

the effect size of their manipulation on changes in self-efficacy, our calculations indicate large effects from pre- to post-treatment. In an experimental study focusing on academic outcomes, for example, Schunk (1981) attempted to manipulate student's self-efficacy for maths in 56 children aged 9 to 11, who had low arithmetic achievement. Children were randomly assigned to one of two conditions: modelling of division operations or didactic instruction, followed by a practice period. Both instructional treatments increased children's perceived self-efficacy for maths from pre- to post-treatment ($d =$ ranged from .83 to 1.55).¹

In another example, Schunk, Hanson and Cox (1987) conducted two experimental studies in which students were randomly assigned to receive maths instruction from either a same or opposite sex model using either coping modelling, mastery modelling, or no modelling (control group). Coping models initially demonstrated the typical fears and deficiencies of observers but gradually improved their performance and helped to demonstrate how to gain self-confidence, whereas mastery models demonstrated faultless performance from the outset. Children were aged 9 to 13 years and were enrolled in below-grade-level classes. Children who were assigned to the coping model had subsequently higher self-efficacy ($d = 3.04$ for boys; $d = 3.23$ for girls)² from pre to post-treatment compared to children assigned to the mastery model.

Causal Evidence

Most previous studies examining self-efficacy beliefs in children and adolescents are correlational, which is likely due to the challenge of manipulating self-efficacy in an experimental setting. However, in their meta-analysis, Multon and colleagues (1991) found that a large effect size ($r = .58$) when examining the relationship of self-efficacy to persistence and academic performance in experimental studies. As noted, there also are several experimental studies which have manipulated self-efficacy beliefs which, in turn, predicted better academic outcomes including task persistence, interest and/or performance. For example, Schunk (1981) found that self-efficacy explained nearly a quarter of the score on a later mathematics test, taking into account prior mathematics achievement. Together, these studies provide some indication that self-efficacy predicts greater academic persistence and higher achievement. However, there is less evidence that self-efficacy has a causal relationship with outcomes in non-academic domains.

Conclusion

These experimental studies indicate that self-efficacy for a particular task is malleable and that improved self-efficacy is associated with greater persistence, interest, and performance. Together, these findings suggest that believing one can meet the demands of a given task is a prerequisite to putting forth sustained effort. Given this, self-efficacy beliefs appear to be an essential precursor to enhancing other non-cognitive skills. In other words, young people may be reluctant to persist at learning new skills unless they believe they are likely to succeed, especially if the task is challenging or they do not experience success at first (Pajares, 1996).

A few caveats must be kept in mind, however. First of all, most of these studies are locally-based and conducted by the same group of researchers. A wider evidence base is necessary to indicate with certainty that improvements in self-efficacy led to improvements in the related skill area, especially in non-academic domains. Second, there is little evidence of a lasting impact of manipulations on later outcomes. Most of these experimental studies measured the outcomes at the end of the trial period; therefore, it is difficult to know whether an increase in self-efficacy was sustained and whether there was an impact on longer term outcomes. One issue to keep in mind is that any lasting impact of an intervention may depend on an individual's continued improvement in that skill area. In other words, there is likely to be a reciprocal relationship among self-efficacy and academic performance: strong academic performance validates self-efficacy, increases motivation, and reinforces effort and persistence toward academic tasks (Farrington et al., 2012). Lastly, the strength of self-efficacy as a predictor of later outcomes is likely to vary according to the generality versus specificity of its measure. When a general academic measure is required, the four self-efficacy items in SAL instrument represents a shortened, validated scale. However, the best predictors of specific academic performance are self-efficacy beliefs regarding those specific academic domains (Pajares, 1996). Therefore, programmes which target self-efficacy beliefs will likely experience greater success when they focus on a specific area of improvement and employ a measure which reflects self-efficacy beliefs regarding that particular domain, i.e., mathematics.

¹ Effect size calculated by authors using reported means and standard deviations.

² Effect sizes calculated by authors from means and standard deviations reported in article.

3.2 Motivation

Motivation is the study of why individuals think and behave as they do. A wealth of motivational theories has focused on understanding the relationship between one's motivation and their later achievement. These include the theory of intrinsic/extrinsic motivation (Deci, 1971), achievement goal theory (Dweck & Leggett, 1988; Ames, 1992); attribution theory (Weiner, 1979); expectancy-value theory (Eccles et al., 1983) and locus of control (Rotter, 1954). In this review, we examine achievement goal theory, expectancy-value theory, and intrinsic/extrinsic motivation, all of which have shown some degree of malleability in experimental studies

3.2.1 Achievement Goal Theory

Definition

Achievement goal theory proposes that motivation and achievement-related behaviours can be understood by considering the reason or purpose individuals adopt while engaged in academic work (Ames, 1992; Dweck & Leggett, 1988). Achievement goal theory distinguishes two types of goal orientations: (a) a learning orientation focused on gaining competence in a subject area or skill and (b) a performance orientation focused on demonstrating competence to others regardless of actual gains in ability or knowledge, seeking relative success, and comparing their performance to peers (Ames, 1992). When individuals believe that they can increase their ability through their own efforts, they are more motivated to put forth effort, persist despite setbacks, and use strategies to achieve their goals. Conversely, individuals who believe that their ability is fixed and cannot be changed are more likely to focus on others' assessments of their ability, give up when they experience a setback or failure, and have lower performance.

Measurement

There is a wide variety of different instruments used to measure goal orientation. The Patterns of Adaptive Learning Scale (PALS) is a recent measurement which has been developed to examine the relation between the learning environment and students' motivation, affect, and behaviour. PALS has been shown to have robust reliabilities and good factor structure. Student scales assess 1) personal achievement goal orientations; 2) perceptions of teacher's goals; 3) perceptions of the goal structures in the classroom; 4) achievement-related beliefs, attitudes, and strategies; and 5) perceptions of parents and home life. Teacher scales assess their perceptions of the goal structure in the school, their goal-related approaches to instruction, and personal teaching efficacy (Midgley et al., 2000). To assess growth mindset, Dweck and her colleagues have developed an implicit theory of intelligence measure. This measure includes six items: three statements measuring a fixed mindset (e.g., "You have a certain amount of intelligence, and you really can't do much to change it"); and three statements assessing a growth mindset (e.g., "You can always greatly change how intelligent you are"). Respondents indicated their agreement with these statements on a 6-point Likert scale from 1 (strongly agree) to 6 (strongly disagree). This measure has demonstrated high internal reliability and validity (Dweck, Chiu, & Hong, 1995).

Correlational Evidence

Correlational studies indicate that students who espouse a mastery goal orientation are more likely to monitor their understanding of what is being learned (e.g., Meece & Holt 1993, Middleton & Midgley 1997), employ organizing strategies such as paraphrasing and summarizing (Archer 1994), and make positive, adaptive attributions for occasional failures compared to students who adopt performance goals. Studies have also found a difference in students' affective reactions according to goal orientations. Students who adopt a mastery orientation tend to demonstrate more pride and satisfaction in their success and have less anxiety in the event of failure than students who adopt a performance goal orientation (Ames 1992). Furthermore, research has shown that the increased effort and persistence of a mastery goal orientation leads to higher academic achievement (Elliot & Harackiewicz 1996; Meece & Holt 1993, Pokay & Blumenfeld 1990).

Malleability

Recent research has focused on implementing brief treatments or short-term programmes designed to promote growth mindsets. According to Dweck (2006), a learning orientation is equivalent to a “growth mindset,” in which the fundamental belief is that “your basic qualities are things you can cultivate through your efforts” (p. 7). A performance orientation, on the other hand, is equivalent to a “fixed mindset” in which the fundamental belief is that “your qualities are carved in stone” (Dweck, 2006, p. 6). For children and adolescents, most of this work has focused on changing academic mindsets. Experimental studies which have included both before and after measures have found that young people can develop a growth mindset as a result of intervention (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Cohen et al., 2006; Dweck, 2007; Good, Aronson, & Inzlicht, 2003; Oyserman, Bybee, & Terry, 2006; Walton & Cohen, 2007, 2011).

For example, Blackwell and colleagues (2007) randomly placed seventh-grade students (age 12) in one of two weekly workshops for eight sessions. In the treatment group, students learned that intelligence is changeable and that the brain is like a muscle which grows with use. In the control group, students learned only study skills. After the eight-week intervention, the researchers tested the understanding of all students about how the brain works, as well as measured changes in their beliefs about the nature of intelligence. They found that students in the treatment group changed their understanding of the brain and their beliefs about intelligence such that they endorsed an incremental theory more strongly after participating in the intervention (4.36 pre-intervention vs. 4.95 post-intervention ($d = .66$), but participants in the control group did not change their beliefs (4.62 pre-intervention vs. 4.68 post-intervention ($d = .07$)).

Causal Evidence

Studies have also established that there may be causal, not merely correlational, relationship between goal orientations and achievement. For example, Schunk (1996) manipulated the goal orientation of children aged 9 to 11 while doing maths problems. Children were randomly assigned to one of four experimental conditions: mastery goal with self-evaluation, teaming goal without self-evaluation, performance goal with self-evaluation, performance goal without self-evaluation. Children who were directed to work under a mastery learning goal orientation demonstrated greater task involvement and greater subsequent achievement than children who worked under a performance goal orientation. Similar differences have been produced by other investigators using a variety of quasi-experimental and experimental manipulations, (Elliott & Dweck, 1988; Schunk, 1996; Schunk & Rice, 1989, 1991; Schunk & Swartz, 1993a, 1993b).

Interventions focusing on growth mindsets have also shown significant effects on academic outcomes. In one experimental study, for example, Aronson, Fried, and Good (2002) had university students write “pen pal” letters and a short speech about the nature of intelligence to encourage younger students. Students were randomly assigned to either the treatment or control condition. In the treatment condition, the letter writers were supposed to promote the idea that intelligence is malleable (a growth mindset). The researchers found that students in the treatment group had overall college GPAs that were 0.23 grade points higher than the control groups by the end of the following school term.

In their experimental study supporting the notion of malleable intelligence and growth mindsets (described above), Blackwell et al., 2007 also found that their intervention understanding the brain as a muscle that needs training had a significant effect on students’ grades. Prior to the intervention, both the treatment and control group had declining maths grades. Post-intervention, the mathematics grades of students in the treatment group stabilised while the grades of students in the control group continued to decline, for an overall difference between groups of 0.30 grade points by the end of the year.

Conclusion

The results of these interventions suggest that mindsets are malleable and that changing students’ mindsets may result in small to medium size improvements in later performance. These findings warrant possible investment in developing growth mindsets for children and adolescents. However, there are a number of considerations which must be kept in mind.

Much of the intervention research has focused on a short-term intervention using small samples in single schools. Therefore, it is not known whether there are long-term, lasting effects across different contexts. It is possible that promoting a growth mindset may not be a simple solution for sustained academic performance. A recent quasi-experimental study, for example, investigated the impact of Brainology (an online interactive programme aimed at

encouraging a growth mindset) on the mindset, resiliency, and sense of mastery of pupils aged 13–14 years (Donohoe, Topping, & Hannah, 2012). Findings indicated that the programme led to a significant increase in mindset scores for the intervention group. However, there was a significant decline at follow-up and the initial impact of the intervention was not sustained. This finding suggests that the longer term effectiveness of mindset interventions needs to be investigated further. While many questions remain to be answered, the intervention evidence to date—particularly in combination with the earlier theoretical and empirical work upon which it is built—continues to make a strong case that growth mindsets may be an important factor in enhancing academic achievement. Nevertheless, these conclusions must be taken with caution as the findings to date have focused mainly on short-term outcomes in the academic domain; therefore, it is unknown whether these findings are generalisable to other skill-areas and contexts.

3.2.2 Intrinsic/Extrinsic Motivation

Definition

Intrinsic and extrinsic motivation distinguishes between different reasons or goals that give rise to an action (see Sansone & Harackiewicz 2000, for a review). Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable. When intrinsically motivated, a person is moved to act for the fun or challenge involved rather than because of external prods, pressures, or rewards. Extrinsic motivation, on the other hand, refers to doing something for instrumental or other reasons, such as receiving a reward. Self-determination theory (SDT) elaborates on the intrinsic/extrinsic motivation distinction with the idea of autonomy versus control (Deci & Ryan, 1985). According to SDT, intrinsic motivation develops as a result of autonomous, self-determined decisions that give individuals a sense of control and power. In contrast, extrinsic motivation is created when individuals are forced or compelled to act through controlling situations.

Measurement

There are many different ways to assess intrinsic versus extrinsic motivation. A scale which has shown to be reliable and valid is the MSLQ (Pintrich, Smith, García, & McKeachie, 1993). As described in the self-efficacy section, the MSLQ includes a sub-scale measuring intrinsic/extrinsic motivation.

Correlational Evidence

Over the past two decades, more than 800 publications have explored intrinsic/extrinsic motivation. A review of the literature (Vallerand, 1997) reveals that a large portion of this research deals with studies that have been conducted on situational motivation. Situational motivation refers to the motivation individuals experience when they are currently engaging in an activity. In general, this research has shown that the quality of experience and its related outcomes can be very different when engaging in an activity for intrinsic versus extrinsic reasons. Intrinsic motivation leads to high-quality learning and creativity, while extrinsic motivation reduces interest and engagement in an activity. Intrinsic motivation, furthermore, is positively related to psychological well-being and positive adjustment. Extrinsic motivation, on the other hand, is associated with poorer well-being and less optimal functioning for children and adolescents compared to intrinsic motivation (see Vallerand, 1997).

Malleability

The findings of meta-analytic studies suggest that intrinsic motivation can be manipulated in an experimental setting. In a meta-analysis of 128 experimental studies, Deci, Koestner, and Ryan (1999) examined the effects of extrinsic rewards on intrinsic motivation. They found that all types of rewards significantly undermined intrinsic motivation and self-reported interest ($d = -.40$ to $-.28$). Tangible rewards tended to be more detrimental to intrinsic motivation for children than college students, and verbal rewards tended to be less enhancing for children than college students. Another meta-analysis of 41 experimental studies found that choice enhanced intrinsic motivation ($d = .36$) (Patall, Cooper, & Robinson, 2008). Together, these studies indicate that intrinsic motivation can be improved under certain circumstances.

Causal Evidence

Several recent quasi-experimental and experimental studies have also shown that increased intrinsic motivation leads to higher performance. In a quasi-experimental study, Guthrie and colleagues examined the role of using interesting, hands-on tasks in the classroom to stimulate intrinsic motivation for reading (Guthrie et al., 2006).

Children in grade 3 (aged 8) were in one of four classrooms which varied according to the number of interesting, hands-on activities such as observations and experiments that were taught. Students with a higher number of hands-on tasks increased their reading comprehension after controlling for initial comprehension more than did students in comparable intervention classrooms with fewer hands-on tasks. Students' intrinsic motivation predicted their level of reading comprehension after controlling for initial comprehension.

In another set of experimental studies, Vansteenkiste and colleagues examined the role of goal framing on later performance. Students were randomly assigned to an experimental condition. Each experiment framed students' learning in terms of whether it served a long-term intrinsic goal or a long-term extrinsic goal. Results indicated that test performance and subsequent persistence were greater in the intrinsic-goal condition than in the extrinsic-goal condition. The effect sizes for the intrinsic versus extrinsic-goal condition were .59 for motivation, .21 for test performance and .12 for persistence. These results were replicated in a variety of studies using different intrinsic goals (e.g., personal growth and health), different extrinsic goals (e.g., physical attractiveness), different learning materials (business communications), and different age groups (5th- to 6th-graders, 11th- to 12th-graders, college students) (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Vansteenkiste, Simons, et al., 2005). Together, these studies indicate that contexts which highlight intrinsic versus extrinsic-related goals encourage greater motivation, more persistence, and higher achievement for students of all ages.

Conclusion

Past research indicates that students who are focused on intrinsic-related goals for engaging in an activity show greater motivation, more persistence, and higher achievement compared to students who are focused on extrinsic-related goals. These studies further highlight the "here and now" nature of intrinsic/extrinsic motivation (Vallerand, 1997) by demonstrating that contexts play an important role in one's orientation toward either intrinsic or extrinsic goals when engaged in a specific activity. This has positive implications for educators, as it indicates that teachers can help shape student's intrinsic motivation for learning through their teaching methods and classroom context. Nevertheless, this further suggests that intrinsic motivation may not necessarily be an expertise that can be gained through participation in an intervention which then is applicable to other situations and contexts. While enhancing intrinsic motivation is an important tool in supporting educational contexts, there is little evidence that intrinsic motivation is a skill that can be cultivated in relation to future outcomes.

3.2.3 Expectancy-Value Theory

Definition

According to expectancy-value theory, motivation to achieve is best described as consisting of (1) students' expectations of success and (2) their perception of the overall value of the activity or task. Eccles and colleagues (1983) have defined expectancies for success as individuals' beliefs about how well they expect to do on upcoming tasks, either in the immediate or long-term future. Expectancy beliefs are measured in a similar manner as Bandura's (1997) self-efficacy beliefs. Expectancy for success is however understood to be only effective, if the task at hand is also valued by the individual. The expectancy-value theory thus includes additional aspects (i.e. task values) that have to be considered when predicting whether an individual will successfully engage with a task. For task-value, Eccles and colleagues (1993) have defined four types. *Attainment value* is the personal importance of doing well on the task. *Intrinsic value* is the enjoyment obtained from performing the activity. *Utility value* is how well a task relates to current and future goals. Lastly, *cost* is conceptualised in terms of the negative aspects of engaging in the task, such as anxiety and fear of failure, as well as the amount of effort needed to succeed and the lost opportunities that result from making one choice rather than another.

Measurement

There are many versions of measures that have been used and adapted from previous studies for the purposes of different investigations. Many studies have relied on scales for expectancies of success and task value which have been developed by Eccles and her colleagues (see Eccles et al., 1993). In their research, these scales have shown to be valid for different populations of children and young people.

Correlational Evidence

Most research using an expectancy-value framework has examined longitudinal panel data. Overwhelmingly, these studies have shown support for the expectancy-value model. Eccles and her colleagues have found that,

even when previous performance is controlled, children's expectations for success in combination with valuing the task are the strongest predictors of subsequent performance (see Eccles & Wigfield, 2002). These findings have been shown in a variety of domains such as academic achievement, participation in sport (e.g., Fredricks & Eccles, 2002; Xiang, McBride, Guan, & Solmon, 2003), involvement in extracurricular activities (e.g., Simpkins & Fredricks, 2012); and occupational choices (e.g., Eccles, 1994).

Malleability

A few recent experimental studies have examined expectancy-value theory (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Hulleman & Harackiewicz, 2009). Together, these studies suggest that interventions can improve students' expectancies for success, as well as their interest in, and value of, different academic tasks. For example, Hulleman and Harackiewicz (2009) implemented a school-based intervention where ninth-graders (i.e., age 14) wrote essays each month about weekly topics in science class. Students were randomly assigned to either a treatment or control group. Students in the treatment group wrote about how the science topics applied to their lives, while students in the control group wrote summaries of weekly science topics. After the intervention, students in the treatment group reported a greater interest in science and were more likely to indicate plans to take science-related courses in the future than were students in the control group. They also showed higher academic performance, as discussed below.

Causal Evidence

Experimental studies have documented positive findings, indicating that interventions which increase students' expectations for academic success as well as their personal value of schooling can have a significant impact on their achievement in the future. Cohen and colleagues (2009), for example, designed an intervention aimed at reducing the racial achievement gap by countering negative stereotypes about academic abilities and achievement. The researchers focused specifically on students' reflections on personally important, overarching values as a way to lessen the threat and stress of negative stereotyped ethnic minority students. The researchers asked African American and White seventh-graders to complete brief writing exercises three to five times during the year. The researchers conducted this experiment with three independent cohorts (N = 133, 149, and 134). Students were randomly assigned to either a treatment or control group. In the treatment group, students wrote about values that were important to them. In the control group, students wrote about a neutral topic. Over 2 years, the grades of African Americans were, on average, raised by 0.24 grade points. Low-achieving African Americans were particularly benefited. Their GPA improved, on average, 0.41 points, and their rate of remediation or grade repetition was less (5% versus 18%).

In the study described above, Hulleman and Harackiewicz (2009) found similar results. Students in the treatment group who started out with low expectations for success saw the greatest improvement in their subsequent grades at the end of the term relative to the control group (0.80 grade points difference). However, there was no significant difference in the grades of students in the treatment group who already expected to do well. Together, these findings suggest that expectancy-value interventions are most effective improving the academic achievement of low-achieving students with low expectations.

Conclusion

Expectancy-value theory provides a possible framework that may be useful in interventions focused on enhancing self-perceptions and subsequent motivation. The experimental studies which have examined expectancy-value model show that encouraging young people to consider the value and meaning of a task in their own lives is likely to support their interest and engagement in that domain in the future. This was especially relevant for students who had low expectancies for success

Research has also shown that task values play a crucial role in the employment of learning strategies. It is not enough for students to know about learning strategies, it is only when students truly value the work do they voluntarily use those strategies (see Pokay & Blumenfeld, 1990). This underscores the importance of highlighting the value of tasks for young people in interventions aimed at improving self-perceptions and engagement. This is particularly salient for females and ethnic minority groups who may encounter negative stereotypes in particular domains regarding their social membership, e.g., girls in STEM (science, technology, engineering and mathematics). However, there are only a few experimental studies which have focused on expectancy-value theory, so it is important to consider that the results are quite preliminary.

3.3 Perseverance

Perseverance is a widely used concept within research which involves steadfastness on mastering a skill or completing a task. In this review, we focus on two manifestations of perseverance: engagement and grit. Both concepts concern an individual's investment in accomplishing a task or goal, yet they are distinguishable both conceptually and psychologically. Engagement involves how students behave, feel, and think regarding their commitment to academic tasks, activities, or school more generally (Fredricks, Blumenfeld, & Paris, 2004), while grit refers to a trait-level perseverance and passion for long-term goals which is related to Conscientiousness (Duckworth, Peterson, Matthews, & Kelly, 2007).

3.3.1 Engagement

Definition

Engagement is a meta-construct which includes behavioural, emotional, and cognitive components (Fredricks et al., 2004). *Behavioural engagement* draws on the idea of participation; it includes involvement in academic, social, or extracurricular activities and involves a range of behaviours such as effort, persistence, concentration, attention, asking questions, and contributing to class discussion that are considered crucial for achieving positive outcomes. *Emotional engagement* encompasses affective reactions to teachers, classmates, academics, and school. Lastly, *cognitive engagement* incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills. Recent evidence suggests that the three dimensions are interlinked (Li & Lerner, 2013; Wang, Willett, & Eccles, 2011), yet can develop differently over time (Wang & Eccles, 2012a).

Measurement

Many different measures of engagement have been used. Fredricks et al. (2004) and Jimerson, Campos and Greif (2003) provide an overview of these different measures across behavioural, cognitive, and emotional engagement. In most cases, especially for behavioural and emotional engagement, items have been adapted from previous studies and there is little or no documentation of their construct validity. Recently, however, Appleton, Christenson, Kim, and Reschly (2006) developed a self-report school engagement instrument incorporating both emotional and cognitive aspects, which has shown good construct validity using an ethnically and economically diverse sample.

Correlational Evidence

For the most part, the research on engagement has employed correlational methods and many studies have used engagement as an outcome rather than a predictor. Nevertheless, there is strong support for significant correlations between school engagement and academic outcomes (see Fredricks et al., 2004, for a review). There is also evidence that emotional school engagement is associated with children's emotional adjustment, irrespective of prior academic achievement (Gutman et al., 2008). Based on evidence from longitudinal data, school engagement also has been associated with the prevention of antisocial behaviours, such as delinquency, school drop-out and substance use (Li, Zhang, et al., 2011; Wang & Eccles, 2012), and positive mental health (Li & Lerner, 2011). It furthermore has been shown to promote successful career development over and above cognitive ability (Schoon, 2008) and as an important resource capacity for students who encountered a problematic transition, such as leaving school early (Sacker & Schoon, 2007; Schoon & Duckworth, 2010). In addition, recent evidence points to a significant role of school engagement in shaping political trust, i.e. the confidence people place in their government and institutions (Schoon & Cheng, 2011).

Malleability

Christenson and colleagues (Christenson et al., 2008) developed a programme entitled Check and Connect designed to promote student engagement (which includes academic, behavioural, cognitive, and affective components), support regular attendance, and improve the likelihood of school completion for students at-risk of school drop-out. Mentoring is the central tenet of the model. Students are assigned a mentor to work with them for at least two years. The mentor works to build relationships with the student, their family, and the school staff. The mentor routinely monitors their school attendance and checks for warning signs of school disengagement. They

also teach the student problem-solving strategies and encourage active participation in school-related activities. A series of studies have been conducted which measure pre- and post-treatment outcomes, without a control group. Findings show that students enrolled in Check and Connect showed increased levels of school engagement.

Causal Evidence

There is scant experimental evidence regarding the role of school engagement in changing students' outcomes. In Check and Connect, findings show that students enrolled in Check and Connect showed better school attendance (Lehr, Sinclair, & Christenson, 2004; Sinclair, Christenson, Elevo, & Hurley, 1998). In particular, the quality and closeness of the relationship between students and intervention staff was associated with improved school attendance, highlighting the importance of emotional school engagement for high-risk young people (Anderson, Christenson, Sinclair, & Lehr, 2004). Evidence from correlational studies also point to the significant role of the school context, in particular school climate and peer interactions in supporting the formation of school engagement (Li, Lynch, Kalvin, Liu, & Lerner, 2011; Wang & Eccles, 2012b).

Conclusion

Research supports that there is a correlation between school engagement and positive outcomes including achievement, school retention, and emotional wellbeing. Furthermore, evidence from the Check and Connect programme indicates that school engagement is malleable which may lead to greater school attendance and participation. However, there is very little experimental evidence which has demonstrated a causal relationship between engagement and later outcomes. The difficulty establishing a causal relationship centres on the nature of engagement, itself. It has been defined more as an outcome of a situational context, rather than a characteristic of the individual. Thus, school-wide interventions are likely to be the most successful avenue for raising engagement.

3.3.2 Grit

Definition

The concept of 'grit' has received a lot of attention recently. Grit is seen as a non-cognitive **trait**, based on an individual's passion and perseverance for a longer-term goal. What distinguishes grit from other aspects of perseverance is its *long-term* quality, noting that gritty individuals will work steadfastly on one significant goal over a prolonged period. According to Duckworth and colleagues (2007):

Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress. The gritty individual approaches achievement as a marathon; his or her advantage is stamina. Whereas disappointment or boredom signals to others that it is time to change trajectory and cut losses, the gritty individual stays the course.

Measurement

Duckworth and colleagues have developed a grit scale (Duckworth et al., 2007; Duckworth & Quinn, 2009). The original scale consists of two factors comprising stamina in the dimensions of Interest and Perseverance of Effort. This original self-report scale for grit (Grit-O) has twelve items. However, the predictive validity of this scale for different outcomes was not explored. Later, Duckworth and Quinn (2009) created a shortened version (Grit-S) which retains the original two-factor structure with four fewer items. An analysis of its psychometric properties confirmed the two factor structure and demonstrated acceptable internal reliability.

Correlational Evidence

Duckworth and colleagues have demonstrated that grit is associated with positive outcomes in a number of correlational studies (Duckworth et al., 2007). For example, in a study of university students attending University of Pennsylvania, grit was associated with the grades of university students ($r = 0.34$), which was similar to the association between GPA (grade point average) and SAT (university entrance exam) scores ($r = .30$), when controlling for prior exam scores. Students with higher grit scores tended to have higher GPAs but lower SAT scores than their less gritty peers. This finding suggests that what students lack in achievement they can compensate for in grit. However, the average SAT score of students in the University of Pennsylvania study was 1415, a score achieved by less than 4 percent of SAT test-takers nationally (Duckworth et al., 2007). It is

uncertain if there would be an association between grit and grades using a student population at a less academically challenging university. Furthermore, students completed the grit scale and reported their cumulative GPA at the same time. As a result, students' grit may have been influenced by their performance in school, in other words, students who were doing well might have reported more grit rather than vice versa (Farrington et al., 2012).

A further study examined the longitudinal association between grit and grades for military cadets at West Point. Grit was measured at entrance to West Point and then associated with grades one year later. The relationship between grit and grades was much smaller than at the study at University of Pennsylvania, although still significant ($r = 0.06$). This indicates that while grit measures might correlate highly with current grades, they may not be as strong a predictor of future academic performance (Duckworth et al., 2007). Additional studies have found positive correlations between grit and positive affect, happiness, and life satisfaction (Singh & Jha, 2008), the use of learning strategies (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011), and exercise behaviour (Reed, Pritschet, & Cutton, 2012).

Malleability

Although correlational studies have shown a significant association between grit and positive outcomes, there are no experimental studies investigating whether it is possible to improve one's grittiness. This is likely due to the conception of grit, which was designed to be an inherent personality trait— related to Conscientiousness. Nevertheless, this does not necessarily mean that it is impossible to change a person's grittiness but rather that doing so in a consistent manner would be challenging (Farrington et al., 2012). According to Duckworth (2013), her lab has turned its attention to focusing on how to intentionally cultivate grit and self-control.

Causal Evidence

As mentioned, there are no experimental studies which have improved grit and then examined the effect of this increased grittiness on subsequent outcomes. As a result, there is no evidence of a causal effect of grit on later outcomes. Interestingly, in as yet unpublished cross-sectional studies of school-age children, Duckworth (2013) has found moderate, positive associations between grit and growth mindset, suggesting that growth mindset may contribute to the tendency of a gritty individual to sustain their effort and commitment to achieving a long-term goal. However, to date, there is no conclusive, experimental research.

Conclusion

There is no causal evidence linking grit to positive outcomes. On the same note, there is little evidence that grit is, in fact, a stable character trait. Grit has yet to be measured at multiple time points in a person's life to determine whether it changes or remains constant across time. As with other facets of perseverance, grit is likely to be influenced by multiple factors, including development as well as the situational context. There is a wealth of research showing that students' persistence at tasks changes over time and in different situations, including studies we have already reviewed showing that high self-efficacy, a mastery goal orientation, and intrinsic motivation relate to increased persistence at tasks. Furthermore, the research on grit has focused on understanding what in addition to intelligence and talent set apart exceptional individuals. As a result, these studies cannot easily be generalised to broader populations. Given the lack of experimental evidence and the other concerns noted, there seems little evidence that grit is a possible factor to target for interventions at this time. It may be, however, that further evidence will provide greater clarity on this issue.

3.4 Self-Control

Definition

Self-control has attracted substantial attention. According to Duckworth and Kern (2011), more than 3% of all publications are indexed in the PsycInfo database by the keywords self-control and its related terms including self-discipline, delay of gratification, self-regulation, and impulse control. The operational definitions vary widely but self-control is generally defined as the ability to resist short-term impulses in order to prioritise longer-term goals. According to Baumeister, Vohs, and Tice (2007): “Self-control is the capacity for altering one’s own responses, especially to bring them into line with standards such as ideals, values, morals, and social expectations, and to support the attainment of long-term goals” (p. 351). This involves exerting self-control over behaviours, feelings, and thoughts in order to conform to rules, plans, promises, ideals, and other standards.

Self-control is considered to have stable individual differences as measured by Conscientiousness as one dimension of the Big Five aspects of personality. According to Gottfredson and Hirschi (1990), lack of self-control is comprised of six inter-related characteristics including: (1) impulsivity and inability to delay gratification, (2) lack of persistence, tenacity, or diligence, (3) partaking in novelty or risk-seeking activities, (4) little value of intellectual ability, (5) self-centeredness, and (6) volatile temper. These characteristics are believed to come together for individuals with low self-control. Furthermore, Gottfredson and Hirschi (1990) posit that self-control is malleable during the first 10–12 years of life, but after this point, while self-control tends to improve with age as socialization continues to occur, it is largely unresponsive to any external intervention effort. Thus, although absolute levels of self-control may change within persons (increasing rather than decreasing), relative rankings between persons will remain constant over the life course.

Measurement

Most often, self-control is measured using questionnaires completed by the participant or a close informant (e.g., parent). An often-used scale is the Self-Control Scale (Tangney, Baumeister, & Boone, 2004) includes items about acting “without thinking through all the alternatives,” as well as “resisting temptation,” and “concentrating.” Central to the Self-Control Scale is the notion that an individual has the ability to override or change one’s inner responses, as well as to interrupt undesired behavioural tendencies (such as impulses) and refrain from acting on them. This scale therefore taps into self-control as a dynamic concept, rather than a fixed character trait. The self-control scale is available in total (with 93 items) and brief (13 items) versions, both of which have demonstrated strong convergent validity.

Correlational Evidence

Many studies have explored the correlational relationship between self-control (and its related terms) and achievement and adjustment outcomes. These studies find that self-control is a significant predictor of attainment even when prior achievement is taken into account (Duckworth, 2010; Duckworth, Tsukayama, & May, 2010; Moffitt et al., 2010; Wolfe & Johnson, 1995). Furthermore, greater childhood self-control has been associated with better physical health, less substance dependence, higher personal finances, and fewer instances of criminal offending in adulthood (Moffitt et al., 2010).

Malleability

Interventions have focused on improving self-control, most notably to reduce delinquency and problem behaviours in clinical and non-clinical samples. A recent meta-analysis, for example, examined studies that investigated the effect of early self-control improvement programmes (up to age 10) on improving self-control, and/or reducing delinquency and problem behaviours (Piquero, Jennings, & Farrington, 2010). Studies which had a randomised controlled evaluation design that provided post-test measures of self-control and/or delinquency and problem behaviours among experimental and control subjects were included. The meta-analysis found that self-control improvement programmes are an effective intervention for improving self-control and reducing delinquency and problem behaviours. For example, intervention strategies may involve teaching mindfulness or mediation techniques, cognitive behavioural training such as using verbal mediation strategies (e.g., thinking aloud) and social-problem solving training. The effect sizes of the programmes were positive and significant, and ranged from having a small effect (0.28) to having a rather substantial moderate effect (0.61), suggesting that self-control improvement programmes are by and large successful at improving self-control. The mean effect size

of self-control improvement programmes for reducing delinquency ranged from $-.09$ to $-.30$. The authors conclude that self-control improvement programmes should continue to be used to improve self-control and reduce delinquency and behaviour problems up to age 10. Considering these results, future efforts should be made to examine the long-term effectiveness and cost-benefit of self-control improvement programmes after age 10 (Piquero et al., 2010).

Causal Evidence

In one of the most notable studies testing the importance of self-control for academic achievement, Mischel and colleagues conducted a series of studies, often referred to as “the marshmallow experiment”. In this study, four-year-old children at the Stanford University preschool were left alone with one marshmallow after they were told they could have two marshmallows if they waited to eat the one marshmallow until the experimenter returned. “Wait time” was the length of time the child could wait before eating the marshmallow. Studies showed a relationship between wait time for the second marshmallow and higher academic and social functioning more than one decade later (e.g., Shoda, Mischel, & Peake, 1990).

However, wait time was only associated with later achievement when the marshmallow was put in plain sight and when the children were not given strategies for distracting themselves from thinking about the marshmallow. Children who could wait for the second marshmallow were those with stronger cognitive skills; which enabled them to come up with their own distraction strategies while in plain view of the marshmallow (Mischel & Mischel, 1983). However, the underlining message from these studies is not necessarily that self-control predicts higher intelligence but that higher intelligence may make it easier to initiate self-control strategies (Farrington et al., 2012).

Conclusion

Correlational evidence suggests that childhood self-control predicts achievement and adjustment outcomes, even in adulthood. Furthermore, experimental studies find that self-control can be improved up to age 10 (Piquero et al., 2010). However, fewer experimental randomised studies exist indicating that self-control is malleable after that point, particularly for adolescents and young adults. According to Gottfredson and Hirschi (1990), self-control after age 10 becomes fixed. Nevertheless, researchers suggest that individuals can strengthen their ability to control their feelings, desires, and motivations through practice or exercise (Muravan & Baumeister, 2000). Although self-control may be considered a personality trait – the factors that underlie it—may be influenced by the strategies one utilises to delay gratification.

Situational context undeniably plays a role in the exhibition of self-control. Circumstances may make it easier or more difficult to control one’s impulses, as demonstrated by Mischel’s examination of differing conditions (i.e., putting the marshmallow in plain sight and providing strategies for waiting) on children’s wait times. In another interesting twist on Mischel’s study, for example, children were tested using the marshmallow task in an environment demonstrated to be either unreliable or reliable (Kidd, Palmeri, & Aslin, 2012). Children in the reliable condition waited significantly longer than those in the unreliable condition, suggesting that children’s wait-times reflected rational beliefs about whether waiting would ultimately pay off. Thus, wait-times on sustained delay-of-gratification tasks (e.g., the marshmallow task) may not only reflect differences in self-control abilities, but also rational beliefs about the stability of their environment. Therefore, while individuals may have different innate levels of self-control as a personality trait, the degree to which they demonstrate self-controlled behaviour may depend on their meta-cognitive skills as well as the nature of their environment.

3.5 Metacognitive Strategies

Definition

Metacognitive strategies are goal-oriented efforts to influence one's own learning behaviours and processes by focusing awareness on thinking and selecting, monitoring, and planning strategies that are most conducive to learning (Zimmerman, 2001). Meta-cognitive strategies, for example, include setting goals, planning and problem-solving, being aware of one's strengths and weakness, monitoring one's progress and understanding, and knowing when and why to use certain strategies (Pintrich, 2002).

Measurement

The measurement of metacognitive strategies varies widely (Dinsmore et al. 2008; Rosen et al., 2010). Many studies rely on self-report questionnaires such as the MSLQ which includes measurements of both learning strategies and metacognitive strategies (Pintrich et al., 1993). The learning strategies scales include rehearsal, elaboration, organization, and critical thinking. Metacognitive strategies are assessed by one large scale that includes planning, monitoring, and regulating strategies.

Correlational Evidence

There is considerable correlational research indicating a positive association between the use of metacognitive strategies and academic outcomes, much of which was conducted in the 1980s and 1990s. In a much cited study, for example, Pintrich and DeGroot (1990) examined the self-efficacy, intrinsic value, test anxiety, self-regulated learning, use of learning strategies, and classroom academic performance of seventh graders (age 12) in science and English. The authors found that metacognitive strategies were significant predictor of performance, with correlations which ranged from .22 to .36, depending on the academic outcome.

The use of different meta-cognitive strategies also varies according to the developmental stage of the child or young person (Kuhn, 1999; Steinberg, 2005). For instance, younger children are more likely to use overt strategies such as talking aloud during problem-solving (i.e., self-talk), while older children are more likely to use complex strategies such as evaluating their own style of learning and assessing what they know and what they do not know (i.e., self-appraisal).

Malleability

There are many studies showing that metacognitive strategies can be learned, particularly within specific academic subjects. Dignath et al. (2008), for example, meta-analysed 48 studies investigating the effect of training in self-regulation on learning and use of strategies among students in first through sixth grades. The overall effect size for all studies examining the effect of any type of self-regulation training on the use of cognitive or metacognitive strategies was 0.73.

Training that specifically emphasised metacognitive strategies had an effect size of 0.54. Training approaches that combined metacognitive components with other aspects of self-regulation, such as cognitive or motivational strategies, were even more successful, with average effect sizes of 0.81 and 0.97, respectively. The most effective metacognitive strategies included the combination of planning and monitoring (mean effect size = 1.50) and the combination of planning and evaluation (mean effect size = 1.46), both of which were more successful than teaching any of the skills in isolation or teaching a combination of all three metacognitive skills (planning, monitoring, and evaluation). In studies where the intervention also included instruction designed to promote student metacognitive reflection, the most effective type of instruction emphasized a combination of knowledge about strategies as well as specific benefits of those strategies (mean effect size = 0.95).

Causal Evidence

Several meta-analyses have shown medium to large effects of teaching metacognitive strategies on later performance. In a meta-analysis of quasi-experimental studies by Haller, Childs, and Walberg (1988), the average effect size of metacognitive instruction on reading comprehension across 20 studies contrasting experimental and control groups was .71. Children aged 12 to 13 benefitted most from metacognitive strategy instruction and reading comprehension was greatest when instruction combined the use of several metacognitive strategies rather than focusing on only one or two (Haller, Childs, & Walberg, 1988).

Hattie, Biggs, and Purdie (1996) meta-analysed 51 studies in reading and other subject areas, including quasi-experimental, pre- and post-test, and other designs. They found that the average weighted effect sizes due to training in cognitive and metacognitive skills were .57 on performance, .16 on study skills expertise, and 0.48 on positive affect. Higgins, Hall, Baumfield, and Moseley (2005) conducted a meta-analysis of 29 studies that evaluated the impact of thinking skills programmes in schools. Quasi-experimental studies were selected for the meta-analysis if they had sufficient quantitative data to calculate an effect size (relative to a control or comparison group of pupils) and if the number of research subjects was greater than 10. They found that thinking skills programmes have an above average effect size of .62 on learning outcomes compared to other researched educational interventions. There was relatively greater impact on tests of mathematics (0.89) and science (.78), compared with reading (.40).

In another meta-analysis, Dignath and Buttner (2008) found that training produced an average effect size of .69 across mathematics, reading/writing, and other subjects. Effect sizes were higher when the training was conducted by researchers instead of regular teachers. Moreover, interventions attained higher effects when conducted in the scope of mathematics than in reading/writing or other subjects. Together, these studies show that meta-cognitive training has large effects on mathematics and science and medium size effects on reading and positive affect.

Conclusion

There is clear evidence that meta-cognitive strategies are malleable and can be taught or otherwise developed in students from primary school to university and across a wide range of academic subjects. They have also been shown to have medium to large effects on a number of academic outcomes. However, there are a few caveats to keep in mind:

1. It has not been shown whether or not the positive effects of training persist over long-term and whether students are able to transfer learning strategies from one context to another, particularly non-academic domains. For example, there is evidence suggesting that the benefits of 'thinking skills' programmes often fade over time and do not generalise to other subjects or situations (Claxton, 2007).
2. These studies often rely on student self-reports of strategy use or teacher reports of observable student behaviour. As a result, researchers cannot be sure whether metacognitive strategies have actually been "learned" and put to use or if students are simply telling researchers what they think they are supposed to say, based on the content of the training (Farrington et al., 2012).
3. Research is further limited by not specifically addressing student motivation to engage in the strategy use being studied (Farrington et al., 2012). As Schunk and Ertmer (2000) argue, "teaching a strategy does not guarantee that students will continue to use it, especially if they believe that the strategy is not as important for success as other factors". Students need to be motivated to put forth the additional effort required to utilise the strategies in the first place.

Research highlights the relationship between self-efficacy for learning and effective strategy use, and thus suggests that interventions should not seek to address these issues in isolation. Furthermore, feedback about the value of the strategy, and how well students are applying it increases achievement and the use of self-regulatory strategies more than instruction in strategy use alone. In consideration of these concerns, further research is needed to identify the causes of the benefits of meta-cognitive skills programmes, to determine whether they are due to specific aspects of the programmes or to wider changes in teaching and learning processes which accompany the programmes' implementation (Higgins et al., 2005).

3.6 Social Competencies

In this section, we focus on non-cognitive skills which involve social interactions and relationships with others including leadership and social skills. Leadership is defined and measured in many different ways but usually it concerns perceptions of having power and influence over other people or exhibiting behaviours related to being a leader such as organisational and management skills. Social skills relate to a wide variety of positive interactions with others including having good communication skills, showing empathy, having good friends, and being cooperative. Research, for the most part, has examined social and emotional development more generally; and therefore, there is less information regarding how these different social skills individually relate to later outcomes.

3.6.1 Leadership Skills

Definition

Leadership has been defined as the ability to influence significantly the thoughts, behaviours, and feelings of other people (Gardner, 1995). In recent years, the term “transformative leadership” has also gained attention. Transformative leadership is the ability to inspire individuals to transform themselves and their world (Vealey, 2005).

There are a variety of different theoretical perspectives regarding the study of leadership. The trait or “great person” approach, for example, assumes that leadership depends on the personal qualities of a leader (see Judge, Bono, **Ilies**, & Gerhardt, 2002). On the other end of the spectrum is the behavioural approach, which assumes that leadership behaviours can be learned and acquired through effort and experience. There are also different models which are a combination or extension of these approaches (see Chase, 2010, for a review). Generally, however, there is little consensus concerning whether leadership is innate or learned among those who study it.

Measurement

Leadership instruments tend to be self-report questionnaires or parent/teacher-report questionnaires. These measures vary widely and there has been some question on their reliability and validity for children and adolescents (Oakland, Falkenberg, & Oakland, 1996). The Rating Scale for Leadership (Roets, 1986) is a 26-item Likert-type self-rating measure for students aged 10 to 18 years, which only focuses on leadership abilities. Respondents rate themselves on a five-point scale of the frequency of each of the leadership behaviours listed (always, almost always, sometimes, rarely, never).

Malleability

There are many different programmes that are aimed at developing leadership skills in young people. For the most part, these programmes nurture leadership skills through experiential learning or learning by doing (e.g., Boyd, 2001; Lerner et al., 2005). Experiential learning takes place when a person is involved in an activity, looks back at it critically, determines what was useful or important to remember, and uses this information to perform another activity. This can be accomplished through sport participation and service learning projects such as community service, teaching sports or life skills to younger children, or becoming a mentor for peers.

Successful projects offer young people the opportunity to practise leadership skills and reflect on the experience to learn more about themselves. Skills such as brainstorming, decision-making, setting goals, and working with others are taught and practiced as young people plan and carry out significant service projects. Young people receive support and mentoring from committed adults who, in turn, provide positive role models as well as ensuring the young person’s healthy and active engagement (Lerner, 2004).

Research has shown that different intervention programmes (i.e., service learning, mentoring, community service) can teach and foster leadership skills and positive attitudes, particularly in disadvantaged young people (Boyd, 2001; Lerner et al., 2005; Martinek et al., 2006; Pearlman et al., 2002). For the most part, studies measuring leadership skills have included baseline and post-intervention scores and found a significant increase in leadership and related skills. A few studies have also used a quasi-experimental design by including a comparison group (e.g., Cirillo, Pruitt, Colwell, Kingery, Hurley, & Ballard, D., 1998; Pearlman et al., 2002). For example, Pearlman and colleagues (2002) evaluated the impact of a community-based peer leadership

programme on HIV/AIDS awareness. Young people enrolled as peer educators who completed a short training course and then engaged in ongoing group work with an adult advisor on how to implement HIV/AIDS outreach activities for teens. A quasi-experimental, non-randomised design was employed with two comparison groups (new leaders and repeat leaders) and a control group. Over a 9-month period, peer leaders reported an increase in their self-perception of being an agent for change in their community compared to the control group.

Causal Evidence

There are no conclusive experimental, randomised studies which have manipulated leadership skills and then measured how these increased skills relate to more positive outcomes later. Therefore, we cannot conclude that there is a causal effect of leadership skills on later achievement and adjustment.

Conclusion

There is some evidence suggesting that leadership skills can be developed through training and intervention programmes. However, many questions remain. First and foremost, there is little longitudinal research using experimental, randomised methods. Second, the definition of leadership varies widely across these programmes. For example, some programmes measured self-perceptions of being a leader (Pearlman et al., 2002), while others focused on skills related to leadership such as attitudes toward group work and personal development (Cirillo et al., 1998). Third, these programmes often target several non-cognitive skills. In addition to leadership skills, young people often learn meta-cognitive strategies such as planning and problem-solving, develop social skills, and enhance their feelings of self-efficacy. Therefore, it is difficult to isolate the factor(s) which contribute to positive outcomes. As a result of these limitations, we cannot know with any certainty whether gaining leadership skills in childhood or adolescence translates to more positive outcomes in the future.

3.6.2 Social Skills

Definition

Social skills are defined as “socially acceptable learned behaviours that enable a person to interact effectively with others and to avoid socially unacceptable responses” (Gresham & Elliot, 1990, p. 1). They include a range of pro-social behaviours such as cooperation, sharing, helping, communication, expressing empathy, providing verbal support or encouragement, and general friendliness or kindness.

Most studies of social skills tend to examine different types of pro-social behaviours together, as a single construct. Therefore, there is less information regarding the predictive nature of these different facets of social skills in isolation. For example, there are few studies examining communication skills, with the exception of research focusing on clinical populations (e.g., autistic children). Furthermore, a wealth of research defines pro-social behaviour as embedded in the more expansive concept of social emotional learning (SEL). As a result, it is difficult to extract the social skills component from other non-cognitive factors in this body of research. Lastly, most studies examine pro-social behaviours as outcomes rather than predictors and focus on early and middle childhood.

Measurement

Social skills measures often include both positive and negative behaviours such as the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). The SDQ has five dimensions of behaviour including: emotional problems, conduct problems, hyperactivity/inattention, peer relationship problems, and pro-social behaviour. SDQ is a well-validated instrument for measuring mental health status among children and young children (Goodman, Ford, Simmons, Gatward, and Meltzer, 2000).

The Social Skills Rating System (SSRS) is another popular choice, which also includes both positive and negative dimensions of behaviour (Elliot & Gresham, 1997). However, many argue that positive and problem behaviours are not opposite ends of the same dimension and that positive behaviours should be measured separately to reflect their conceptual independence (Aber & Jones, 1997). Eisenberg and colleagues (e.g., see Eisenberg, Guthrie, Murray, Shepard, & Cumberland, 1999) who have studied pro-social behaviours for children and adolescents use an adapted version of the 23-item self-reported helping scale (**Rushton, Chrisjohn, and Fekken, 1981**). For older adolescents, the Prosocial Behavior Scale is a 16 item Likert-type scale in which

individuals rate the frequency of prosocial behaviour (e.g., sharing, cooperating, taking others' perspectives in difficult contexts) (Caprara, Steca, Zelli, & Capanna, 2005).

Correlational Evidence

There is correlational evidence that students' social-emotional skills can have positive effects on later school performance and psychological wellbeing. In a longitudinal study following students from ages 6 to 16, for example, researchers found that early socio-emotional adjustment in school was predictive of later achievement test scores at every time point (Teo, Carlson, Mathieu, Egeland, & Sroufe, 1996). Research has also consistently found a positive correlation between measures of children's social and emotional skills and measures of later psychological health (see Greenberg et al. 2001, for a review). There is also evidence to suggest that early social skills, such as showing boldness of behaviour towards peers, and being "extrovert" by age 10 predict entrepreneurial activity in adulthood over and above academic ability (Schoon & Duckworth, 2012), a finding which has been confirmed in a cross-national study comparing the precursors of entrepreneurial career choice in Germany and the U.K. (Obschonka, Duckworth, Silbereisen & Schoon, 2012).

Malleability

There is extensive research on social skills programmes showing that, generally, they are effective in enhancing social skills, although the methodological strength of these studies varies (Payton et al., 2008). Many of these programmes address social and emotional learning (SEL) in primary school aged children, and effect sizes generally vary as a function of the extensiveness and scope of the particular programme. Nevertheless, SEL programmes have been shown to yield significant positive effects on targeted social-emotional competencies and attitudes about self, others, and school

In a large-scale meta-analysis examining the impact of school-based universal SEL programmes, for example, Durlak et al. (2011) examined 213 studies of children from kindergarten to high school. To be eligible for inclusion in the meta-analysis studies had to include a control group. They found that SEL interventions had an average effect size of .57 on SEL skills. Furthermore, the effect size of personal-led programmes (i.e., led by SEL trained staff) was .87, while it was .62 for teacher-led programmes.

Causal Evidence

There is a wealth of experimental evidence showing small to medium effects of SEL interventions on a range of positive outcomes. In their meta-analysis, for example, Durlak et al. (2011) found that SEL interventions had an average effect size of .23 on attitudes, .24 on positive social behaviour, .22 on conduct problems, .24 on emotional distress, and .27 on academic achievement.

Conclusion

There is strong evidence that social skills are malleable. However, there are several limitations of this work. First, much of the research looks at social skills for younger children, but it is likely that social skills manifest differently as young people progress through adolescence and enter high school, university, and work settings that require different ways of interacting with one's environment (Farrington et al., 2012). While we know innately that social skills are important as they prepare young people for future work and interacting in the real world, there is less understanding of how to cultivate these skills. This is particularly salient in the high school environment where social skills are used less; increasingly, independent tasks and exams determine a student's individual grade rather than group work or projects (Farrington et al., 2012). Second, there are few longitudinal studies assessing the impact of social skills on achievement, their development over time, and the mechanisms whereby social skills impact future outcomes. Third, it is difficult to isolate the effects of social skills on outcomes as research often bundles them with other non-cognitive skills. More longitudinal research is needed on how we can foster social skills, particularly for teens, in real-world settings such as schools, early work experiences, and service learning projects, and whether these skills translate to success in later adult contexts.

3.7 Resilience and Coping

Definition

Resilience is often thought of as “bouncing back” in the face of setbacks. However, resilience is more than whether individuals continue to persist despite minor setbacks, which is more similar to the concept of grit. Rather, resilience is defined as positive adaptation despite the presence of risk, which may include poverty, parental bereavement, parental mental illness, and/or abuse (Masten, 2009, 2011; Rutter, 2006).

Resilience is not considered an attribute or personality trait that some children possess and others do not, but rather a developmental process. Resilience is demonstrated when children succeed (eg, in terms of educational attainment) despite exposure to significant risks. However, resilience is not indefinite: children who meet the criteria for resilience may not necessarily be doing well continually, for every possible outcome, or across different domains (Schoon, 2006). Children may be considered resilient in one area, but have lower levels in another area of adaptation. For example, high-risk children who are academically successful may experience greater emotional problems or depression

Coping, on the other hand, refers to a wide set of skills and purposeful responses to stress. Coping can be defined as “constantly changing efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of a person” (Lazarus & Folkman, 1984, p. 141). Such demands range from daily hassles to serious trauma such as abuse.

While resilience and coping are both concerned with how individuals respond to stress, they are conceptually distinct. Coping involves skills that people use when faced with specific difficulties, whereas resilience is a process which follows the exercise of those skills (Compas et al., 2001). As a result, coping is malleable and the use of more successful coping strategies can be taught to individuals. Resilience, on the other hand, can be promoted through interventions which focus on reducing risk factors and promoting protective factors that buffer against risk. Nevertheless, resilience is not necessarily a skill that can be manipulated, but rather a dynamic, interactive process. For these reasons, we focus the rest of this section on coping strategies.

Measurement

There are many ways of measuring coping, including open-ended interviews, observations, reports from parents or teachers, and self-report questionnaires for older children and adolescents. There are also many different measurements of coping (Skinner et al. 2003). For older children and adolescents, the Adolescent Coping Orientation for Problem Experiences (Patterson & McCubbin, 1987) is a self-report questionnaire where older children and adolescents report how frequently they used different strategies such as “getting professional help” and “seeking spiritual support.” in response to feeling tense or facing difficulties using a Likert-type scale.

Correlational Evidence

Correlational studies have shown that the coping strategies children and adolescents employ to deal with stressful situations are associated with their psychological and academic outcomes (see Compas et al. 2001, Frydenberg 1997, Garcia, 2010; Rosen et al., 2010; Wolchik & Sandler 1997, for reviews). In general, children with better coping skills tend to have more positive outcomes, including higher self-efficacy, less engagement in problematic behaviour, higher psychological wellbeing, and less depression. Furthermore, positive coping emotions such as confidence and optimism have been positively associated with achievement and wellbeing and negatively associated with stress and depressive symptoms (Huan et al., 2006; Jew, 1999; Patton et al., 2011; Sawyer, Pfeiffer, & Spence, 2009).

The use of different coping strategies has been shown to vary with developmental stages (Skinner & Zimmer-Gembeck, 2007). Younger children often use more physical coping strategies such as intervening directly in stressful situations and seeking help from their caregivers, while coping using cognitive means (e.g., problem-solving and distraction) becomes more common in middle childhood. With age, young people are more able to use meta-cognitive coping strategies such as positive self-talk and cognitive reframing. The tendency to focus on the future in adolescence may also lead to more maladaptive strategies such as rumination, however. The capacity to use particular cognitive strategies under stress (e.g., strategizing, decision making, planning, and reflection) may not fully emerge until late adolescence or early adulthood.

Malleability

A number of interventions have been shown to enhance the effectiveness of coping strategies, most of which have focused on older children and adolescents. For the most part, these interventions have focused on teaching young people positive coping skills, such as social problem-solving and optimistic thinking. A recent meta-analysis examined school programmes targeting stress management or coping skills in children and adolescents (Kraag, Zeegers, Hosman, & Abu-Saad, 2006). Only randomised controlled studies or quasi-experimental studies were included. The findings of this intervention indicate that young people can be taught to use fewer non-productive coping skills, such as worry, wishful thinking, not coping, and ignoring the problem, ($ES = -5.53$, $n = 7$). Another programme focused on the teaching and modelling of optimistic thinking skills (see Cunningham, Brandon, & Frydenberg, 2002). Using a quasi-experimental design, post-test measures showed that children who participated in the programme reported reductions in the use of non-productive coping strategies when compared to the control group.

Causal Evidence

Interventions focused on improving coping skills have documented a subsequent reduction in stress and depressive symptoms, but there is less causal evidence on other outcomes. For example, in their meta-analysis, Kraag and colleagues (2006) found that interventions focused on social problems reduced stress symptoms ($ES = -0.47$, $n = 3$), but did not improve social behaviour. In their intervention, Cunningham and colleagues (2002) found that children in the treatment group reported significant improvements in their ability to cope with stresses and less depressive attributions when compared to those in the control group. Taken together, these meta-analyses suggest that there is no causal evidence that coping skills have significant effects on the outcomes of children and adolescents other than their psychological functioning.

Conclusion

Teaching coping strategies appears to be an effective method to helping young people deal with the stresses of their everyday lives, yet there is limited experimental evidence regarding their effect on other outcomes. One serious limitation of these studies is the different dimensions and definitions of coping and understanding how these strategies overlap.

Another issue is the distinction between coping strategies versus positive emotions, more generally. The positive psychology movement has generated recent interest in the role of positive emotions, such as optimism and gratitude. Seligman has been the main proponent of this research and encourages teaching children “learned optimism”. This area of research deserves more attention as a way to help children and adolescents better manage difficulties in their lives. We also need to have a greater understanding regarding the relationships among positive emotions and some of the other non-cognitive skills we have already discussed. For example, does optimistic thinking relate to feelings of self-efficacy, which then fosters grittiness? Furthermore, do teaching metacognitive strategies enhance the use of more effective coping strategies?

3.8 Creativity

Definition

Creativity is the production of novel and useful ideas. There is some debate over whether creativity is an aspect of intelligence or a personality trait. Some researchers view personality characteristics such as Openness to Experience as conceptually related to creativity; indeed the overlap between both constructs is such that many researchers have used the term Creativity to refer to the Openness trait (e.g., Matthews & Deary, 1998). Others see creativity as related to intelligence and wisdom, a type of giftedness (e.g., Sternberg, 1999). Contemporary work, however, assumes that most individuals are capable of producing moderately creative work in some domain, some of the time, and the social environment can influence both the level and frequency of creative output (Amabile, 1996). In order to be creative, a product or idea must be original. However, it must also be appropriate for the goal at hand, valuable, and expressive of meaning. According to Csikszentmihalyi (1996), creativity results from the interaction of a system consisting of three elements: a culture that contains symbolic rules, a person who brings novelty into the symbolic domain, and a field of experts who recognize and validate the innovation.

Measurement

A popular approach to the measurement of creativity is the psychometric approach, pioneered by Guilford's theory of creativity. The theory posits that the ability to envision multiple solutions to a problem (i.e., divergent thinking) lies at the core of creativity (Guilford, 1950). The Torrance Test of Creativity (TTCT) is based on Guilford's theory and is one of the most widely used measurements of creativity. It has been proven to be a valid and reliable predictor of creative achievement from early childhood through adulthood (Torrance, 1972; 1990). Despite its popularity as a measurement, however, there is much scholarly debate over the validity of divergent thinking as a proxy of creativity. Mansfield and Busse (1981), for example, reviewing studies of divergent thinking in scientific thought, conclude that there is essentially no evidence relating divergent thinking to creative performance. Rather, creativity is viewed by some researchers as a much broader concept involving, for example, passion and devotion to goals, focused attention, curiosity, flexibility, independence, the use of both divergent and convergent thinking, and perseverance (e.g., Csikszentmihalyi, 1996).

Correlational Evidence

A few studies have examined the correlation between creativity and academic achievement. For instance, findings revealed a significant association ($r = .16$) between creativity assessed by the TTCT and the cumulative grade point average of Iranian university students (Habibollah, Abdullah, Aizan, Sharir, & Kumar, 2009). A study of British university students found that creative thinking, assessed by the Alternate Uses Test (Christensen et al., 1960), was significantly related to overall grade point average ($r = .16$) and final dissertation ($r = .46$) (Chamorro-Premuzic, 2006). Overall, these studies suggest that creativity is associated with achievement, especially for university students. However, it is not clear whether this association would remain significant if other factors, such as IQ, were taken into account.

Malleability

Much has been written about the importance of nurturing creativity in children, especially in the classroom environment. There is evidence to suggest that creativity can be developed through training and facilitated through the right type of environment.

For example, an intervention based on creative play has been implemented with children aged 6 to 8 years and aged 8 to 10 years (Garaigordobil, 1995, 1996). The play programme consisted of a weekly 2-hour intervention session throughout the school year. The programme's activities were intended to stimulate verbal, graphic-figural, constructive, and dramatic creativity. The session was structured with a sequence of two or three recreational activities and their subsequent debates. Control participants carried out activities (plastic arts) from the normal school curriculum. The sample included 86 children aged 10 and 11 years, 54 experimental and 32 control, distributed in 4 groups. Before and after the programme, 2 assessment methods were administered: the TTCT and direct judgment by experts who assessed a creative product. Findings suggest a positive effect of the intervention, as the experimental participants significantly increased their creativity. The programme produced a

significantly greater change in the experimental participants who showed a low level of creativity before the intervention.

Other studies have also shown that creativity can be experimentally manipulated with children and university students (see Runco & Sakamoto, 1999, for a review). Findings from several studies reviewed suggest that non-gifted children benefitted most from the creative instruction. According to the authors, this may have occurred because the gifted children were already using the strategies taught in the intervention, so the presentation of the strategies was of little benefit.

Causal Evidence

We were unable to find any recent experimental research which manipulates children's creativity and then examines whether such changes predict outcomes at a later point in time.

Conclusion

There is evidence that creativity can be experimentally manipulated. However, these studies are few in number and tend to be short-term. Furthermore, there is little knowledge regarding whether these interventions have causal effects on positive outcomes in the future for children and adolescents. One of the issues which impedes the field of creativity research is undoubtedly the lack of consensus concerning its definition and measurement. Nevertheless, research clearly outlines how children's environment can either facilitate or hinder creative thinking. In particular, there is vast literature detailing strategies to encourage creativity in the classroom and school environment. These strategies are often similar to suggestions that promote other non-cognitive skills such as offering autonomy and choice, focusing on intrinsic instead of extrinsic rewards, encouraging mastery rather than performance goals, and facilitating engagement.

4. Interventions

Having discussed the evidence on non-cognitive skills, we now focus on a range of interventions that have been developed to try and promote such skills in young people.

Background

In the past few decades, a focus on prevention has emerged, which emphasises supporting young people before problem behaviours occur. Preventative interventions programmes are divided into three subcategories: (a) *universal interventions* that target the general public or a whole population group that has not been identified on the basis of individual risk; (b) *selective interventions* that focus on individuals or population subgroups who have biological, psychological, or social risk factors, placing them at higher than average likelihood of developing a mental disorder; and (c) *indicated interventions* that target high-risk individuals with detectable symptoms or markers predictive of mental disorder but do not meet diagnostic criteria for disorder at the present time (Munoz, Mrazek, & Haggerty, 1996).

More recently, there has been an additional emphasis on the promotion of positive youth development, with the aim of promoting positive behaviours and skills in young people. A range of Positive Youth Development (PYD) programmes have been developed to address this challenge (Catalano, Burgland, Ryan, Lonczak, & Hawkins, 2002; Lerner, Almerigi, Theokas, & Lerner, 2005; Scales & Leffert, 2004). Rather than focusing on deficits, PYD emphasise the strengths, resources, and potential of young people, and has positive expectations regarding the contributions that young people can make to society and to their immediate environments. PYD adopts a holistic view of development focusing on young people's physical, personal, social, emotional, intellectual, and spiritual development. PYD also stresses that interventions should be conducted with considerations of individual choice, values, and culture in mind, focusing in particular on the 5Cs including competence, connections, character, confidence and contribution to society (Lerner, 2005).

The promotion of children's social, emotional, behavioural, and cognitive development is viewed as key to preventing problem behaviours themselves (W. T. Grant Consortium 1992). There is substantial empirical evidence that many outcomes, both positive and negative, are affected by the same risk and protective factors (Masten & Tellegen, 2012). Both positive youth development advocates and prevention scientists have converged in their thinking that models of healthy development hold the key to both health promotion and prevention of problem behaviours (Catalano et al., 2002).

Our Scope

There are many different types of interventions aimed at improving the outcomes of children and young people. In this report, we examine broad categories of interventions which have distinctive implementation strategies but seek similar positive outcomes for young people. In particular, we focus on mentoring, service learning, outdoor adventure, and social and emotional learning programmes. This list does not include groups of interventions such as after school programmes, school-based programmes, or community-based interventions which are subsumed within each of these different approaches.

Our Approach

In this section, we highlight interventions that aim to promote non-cognitive skills in children and/or adolescents. For each type of intervention, we first provide a brief **background**. We then describe the **target population**. We next describe the main **implementation** strategies of the intervention. We then focus on the available **causal evidence** from experimental and quasi-experimental studies about enhancing outcomes. Lastly, we provide a **conclusion**, assessing its strengths and limitations. We also discuss examples of specific programmes. It is important to note that most of these programmes are U.S. based and findings are not necessarily generalisable across contexts.

4.1 Mentoring Programmes

Background

In the past two decades, mentoring programmes for children and young people have increased in popularity. The interest in mentoring programmes was inspired from research highlighting the importance of positive relationships with non-parental adults as a factor in promoting resilience among young people from at-risk backgrounds (Rhodes, 1994). These efforts gave rise to Big Brothers Big Sisters of America (BB/BSA), which has been widely discussed as a model of “best practice” for youth mentoring (e.g., Tierney, Grossman & Resch, 1995). More recently, several mentoring programmes such as Chance UK and Mayor’s Mentoring Programme have been implemented in the United Kingdom.

Target population

Most mentoring programmes have focused on at-risk young people, defined by their individual and/or environmental circumstances (Freedman, 1992). Other specific subgroups that have been targeted include children and young people from single-parent homes (e.g., BB/BSA) and those belonging to racial or ethnic minority groups (e.g., Royse, 1998). Programmes have focused on children and adolescents of various ages and developmental levels. Possible sources of influence on outcomes in this regard include the optimal timing of mentoring as a preventive intervention (Institute of Medicine, 1994) as well as practical issues pertaining to implementation (e.g., receptivity of young people to mentoring at differing stages of development).

Implementation

Mentoring programmes share a common emphasis on establishing mentoring relationships, but they differ in their design, goals, and implementation. While some programmes focus only on mentoring, other programmes are multifaceted in their approach with mentoring being one of several distinct components. Furthermore, some programmes have pursued the general goal of promoting positive youth development (PYD), while others have adopted more focused or instrumental goals relating to areas such as education or employment (Saito & Blyth, 1992).

Another distinction relates to the procedures used for recruiting prospective mentors and the levels of training and supervision that are provided to mentors once selected (Rhodes, 1994). Background checks and other screening procedures (e.g., interviews) have been included consistently in recommended guidelines for the selection of mentors in programmes (National Mentoring Working Group, 1991). Some programmes also have specifically sought out individuals whose backgrounds may make them especially well-suited to forming effective mentoring relationships with young people, such as teachers. Programmes may also match young people with mentors on the basis of criteria such as gender, race/ethnicity, or mutual interests.

Dubois and colleagues find that careful screening and ongoing supervision of volunteers, the monitoring of programme implementation, and the communication of clear expectations that relationships will involve frequent contact over long periods of time are associated with more successful programmes (DuBois, Holloway, Valentine, & Cooper, 2002). Research suggests that the impact of mentoring grows as the relationship matures, and relationships that are of higher quality have stronger positive effects on young people (DuBois et al., 2002; Grossman & Rhodes, 2002).

Causal Evidence

Evaluations of mentoring programmes show modest positive effects. For example, the BB/BSA mentoring programme has been widely reported as effective based on the findings of a large, random-assignment evaluation of the programme (Grossman & Tierney, 1998). Yet the magnitude of these effects was small and generally reflected a relative slowing of negative trajectories rather than outright improvements among those receiving mentoring (Rhodes, 2002). A recent large random-assignment evaluation of BBBSA’s newer, school-based mentoring programme (Herrera, Grossman, Kauh, Feldman, & McMaken, 2007) revealed similar findings. At the end of the school year, there were significant improvements in participants’ academic performance, perceived academic ability, school misconduct, and attendance relative to non-mentored youth. However, there was a relatively small overall effect size for the mentored group compared to the control group ($d = .06$). Furthermore, when youth were reassessed a few months into the following school year, these gains had faded.

A number of meta-analyses have been conducted regarding the effectiveness of mentoring programmes. In general, these programmes have been shown to have low to medium effects. In a meta-analysis of youth mentoring programmes from 1970 to 1998, DuBois and colleagues (2002) examined studies that investigated empirically the effects of participation in a mentoring programme, either by pre-programme versus post-programme comparison on the same group of youth or a comparison between one group of youth receiving mentoring and another group not receiving mentoring drawn from the same population. They found the average weighted effect size across all types of studies was .14. Findings revealed that the effect size was greatest for problem behaviour (.19) and career/employment (.19) outcomes, followed by social competence (.16), academic achievement (.13) and emotional/psychological (.09) outcomes.

DuBois and colleagues conducted a follow-up meta-analysis of the next generation of mentoring programmes published over the 1999 to 2010 (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011). They limited their review to those evaluations that included a comparison group of non-mentored youth. In this meta-analysis, DuBois and colleagues (2011) found that the average effect size of end-of-programme assignments was .21. In terms of specific findings, there was a significant, but small impact of mentoring programmes on attitudinal/motivational (.19), social/relational (.17), psychological/emotional (.15), conduct problems (.21), and academic/school (.21) outcomes, but not on physical health outcomes ((0.06).

Another meta-analysis synthesised the findings from three recent evaluations of school-based mentoring programmes using a randomised design (Wheeler, Keller, & DuBois, 2010). Evidence indicates that school-based mentoring programme effects were generally of small magnitude on selected outcomes. Findings revealed evidence of favourable but low programme effects on six outcomes: truancy (.18), reported presence of a supportive non-familial adult relationship (.12), perceived scholastic efficacy (.10), school-related misconduct (.11), peer support (.07), and absenteeism (.07). Programme effects were not apparent, however, for academic achievement or other outcomes. Furthermore, programme effects were not statistically significant when youth were reassessed a few months into the next school year. Since school-based mentoring programmes are linked to the academic calendar, the mentoring relationships that are established may be less enduring than those forged through community-based programmes.

Conclusion

Research indicates that mentoring relationships can indeed promote non-cognitive skills among young people, yet these benefits are fairly modest in size. In comparison to other prevention programmes for children and adolescents (Durlak & Wells, 1997), the effectiveness of mentoring programmes is relatively small. However, more positive outcomes for some young people may be masked by neutral and even negative outcomes for others involved in less effective mentoring relationships (Rhodes & DuBois, 2008).

A number of factors may enhance the effectiveness of mentoring interventions. First and foremost, beneficial effects are expected only to the extent that the mentor and youth establish a strong relationship that is characterized by mutuality, trust, and empathy. For this type of connection, mentors and youth are likely to need to spend time together on a consistent basis over some significant period of time (Grossman & Rhodes, 2002). Furthermore, the type of relationship is also important. Young people have more significant benefits when their mentor adopts a flexible, but structured youth-centred style where the young person's interests are emphasised. Lastly, significantly stronger positive effects have been found when programmes included training and ongoing supervision of mentors, expectations of relatively frequent meetings and long-lasting relationships between mentors and young people, programme-sponsored activities to enhance the development of mentoring relationships, parent support and involvement, and the addition of other programmes and services to supplement mentoring (DuBois et al., 2002; Herrera et al., 2007). For example, DuBois et al. (2002) found in their meta-analysis of mentoring programmes that expected effects utilizing the full complement of evidence-based practices were nearly three times as large as the benefits found for youth in the typical programme.

Overall, mentoring programmes have the ability to fulfil a much needed gap in many children's lives. In order for mentoring programmes to be successful, however, relationships need to extend beyond mere contact in some sort of mutual activity. Programmes which bring adults in contact with young people in a broad range of activities—such as tutoring, after-school, and service learning programmes—do not necessarily constitute a mentoring relationship (Rhodes & DuBois, 2008). Rather, a mentoring relationship is a process which requires a caring and supportive connection over a sustained period of time in order to provide significant and meaningful benefits for young people.

4.2 Service Learning Programmes

Background

Service learning is an approach that connects community service (ie, volunteering) to classroom learning. Most consider service learning as a form of experiential learning, where reflection transforms experience into new and usable understanding (see Kolb, 1984, for Experiential Learning Model). Its major components include "active participation, thoughtfully organized experiences, focus on community needs and school/community coordination, academic curriculum integration, structured time for reflection, opportunities for application of skills and knowledge, extended learning opportunities, and development of a sense of caring for others" (Bhaerman, Cordell, & Gomez, 1998).

Target Population

In recent years, service learning has burgeoned as a universal programme in many schools in the U.S. Programmes have been successfully delivered to both primary and secondary school students, as well as those attending universities. In the U.K., service learning programmes have also gained in popularity recently.

Implementation

While there are many different methods for implementing service learning, there are several distinct components. The Compact for Learning and Citizenship (CLC, 2001), a project of the Education Commission of the States, outlines that service learning programmes incorporate the following: (1) meet an authentic need in the community, (2) have continuous links between classroom instruction and actual service as it progresses, (3) involve activities in which students themselves plan in collaboration with school and community members, (4) allow students to have decision-making and problem-solving capabilities within the project to foster a sense of ownership, and (5) incorporate structured time to allow students to reflect upon their service experiences.

Evidence of Causality

In one of the more rigorous evaluations of service learning, the National Evaluation of Learn and Serve America incorporated surveys of 150 local agencies at 17 sites in nine states and included more than 1,000 programme participants and comparison group members (Melchior, 1999). The study employed self-report surveys of students who were tracked over two years and matched with a control group. Although there was a strong effort to include higher quality studies, the programmes that were evaluated vary greatly in implementation and therefore need to be considered with some caution. Nevertheless, findings indicated that students who participated in high-quality programmes reported greater gains in measures of school engagement, social science grades, and mathematics grades compared to control groups. Students engaged in service-learning showed an increase in the degree to which they felt aware of community needs, believed they could make a difference, and were committed to service now and in the future. Furthermore, service-learning led to a substantial, statistically significant reduction in arrests of middle school students for its programme participants. Melchior found that students with multiple service learning experiences had more significant and lasting gains across a range of measures than did students who only had a single exposure.

There also have been a few meta-analytic studies examining the effects of service learning. A recent meta-analysis examined 62 studies evaluating service learning programmes (Celio, Durlak, & Dymnicki, 2011). Studies which had at least one control groups were included in their analysis. Their findings indicated that, compared to controls, students participating in service learning programmes demonstrated significant gains in five outcome areas: attitudes toward self, attitudes toward school and learning, civic engagement, social skills, and academic performance. Mean effects ranged from 0.27 to 0.43. Of the five areas, academic performance had the largest effect size of .43, followed by social skills (ES = .30), attitudes about self (ES = .30), attitudes about learning (ES = .30), and civic engagement (ES = .27). Furthermore, as predicted, there was empirical support for the position that following certain recommended practices—such as linking to academic curriculum, incorporating student voice, involving community partners, and providing opportunities for reflection—was associated with better outcomes.

Another meta-analysis of 103 studies of service learning also reported positive effects for different outcomes (Conway, Amel, and Gerwein, 2009). Studies had to have a pre-test/post-test design using identical quantitative

measures for identical pre- and post-samples to be included. Most studies focused on school-age and university age students but 10 studies focused on adults. Effect sizes were moderate for academic outcomes with an average weighted mean of .43. For subcategories, academic motivation, and grades had considerably higher means ($d = .58$ and $.42$, respectively) than did cognitive processes ($d = .29$). The overall results for personal outcomes showed a small but significant effect ($d = .21$). Subcategories for personal outcomes had effect sizes ranging from .16 (volunteer motivations) to .34 (moral development). Social outcomes also showed a small but significant effect of .28. Citizenship outcomes showed the smallest significant effect of .17. Findings were generalizable for all age groups, but university students had higher effects of citizenship ($d = .30$) compared to school-age students ($d = .09$) and adults ($d = .21$). Higher effects were also found for curricular (i.e., taken as part of a course) versus non-curricular programmes. Programmes with structured reflection showed larger changes and effects were found across different educational levels. The effects of service-learning were enhanced when the service-learning included a reflection component, or when faculty integrate the service-learning experience into class discussion (Conway et al., 2009).

Other findings examining service learning are also positive. In a review of service learning programmes, for example, Billig (2000) finds that participation in service learning programmes is associated with positive academic, personal, career and civic outcomes. Another review of three evaluation studies finds that there is a reduction in absenteeism for high school and middle school participants, in addition to increases in homework hours for middle school participants (Melchior & Ballis, 2002). In a study prepared for the Indiana Department of Education consisting of 220 high school students in 10 different schools, overall GPAs were seen to improve from a "B" average to a "B+". In a review of teen pregnancy, service-learning programmes were seen to have the strongest evidence of any intervention that they reduce actual teen pregnancy rates while young people are participating in the programme (Kirby, 2001). A survey of over 4,000 people commissioned by Independent Sector finds that adults who began volunteering in childhood are twice as likely to volunteer as adults, compared to those who did not volunteer when they were younger (Toppe, Golombek, Kirsch, Michel, & Weber, 2002).

Conclusion

Taken together, these studies suggest that participation in service learning is associated with positive outcomes for young people. Overall, findings suggest moderate effects for academic outcomes and small effects for non-cognitive outcomes including social skills, self-perceptions, and motivation. Nevertheless, there is a need for additional multi-site, experimental and quasi-experimental longitudinal studies that can test the effects of various programme characteristics (Eyler, 2002, p. 5). There is also not enough research to date to know which types of students are most affected, which specific programme designs are most powerful, what type of reciprocity with service recipients is needed, how connected to the community the service needs to be, and what impacts occur on the school as an organization or on the community as an entity (Billig, 2000).

4.3 Outdoor Adventure Programmes

Background

Outdoor adventure programmes have become increasingly popular in the past few decades. Modern outdoor adventure programmes are based on the philosophy of experiential education (Gass, 1993). In adventure programmes, individuals or groups are placed in real life situations in which they have to solve problems to deal with the environment around them and the task at hand. Participants have the responsibility of interpreting and manipulating novel situations that they encounter. By coping with their surroundings, they are engaged in learning opportunities. These learning opportunities teach important problem-solving skills, as well as increase feelings of self-competence. Most programmes also incorporate group activities. Many of the activities require communication and cooperation, which are intended to develop team work, social and interpersonal skills.

Target Population

These programmes (also known as 'wilderness programmes', 'outdoor behavioural healthcare' (OBH), or 'adventure therapy') differ widely in their design, implementation, structure, and focus. They have been employed as an intervention to address a number of issues including substance abuse, addiction, problem behaviours and delinquency, psychological difficulties, low self-esteem, and eating disorders/weight management. Outdoor adventure programmes have also been used to promote resilience in at-risk populations, such as victims of abuse. Further, these types of programmes may be used to enhance team-building, leadership, and social skills in children and adolescents more generally.

Implementation

There are three main types of outdoor adventure programmes. They include (a) wilderness challenge programmes, (b) adventure-based programmes, and (c) long term residential camping. Wilderness programmes usually take place in remote settings. Participants often travel long distances without returning to a home base. Many of these programmes focus on survival skills. Adventure programmes centre on team games and problem-solving initiatives and can also include ropes course activities. This approach takes place near a facility and rarely in "remote" settings. Long-term residential camping is usually for severely troubled young people. The campers take trips to various wilderness places, and participate in various activities (e.g., hiking, rafting or climbing).

Causal Evidence

Many quasi-experimental and experimental studies have examined whether outdoor adventure programmes improve outcomes for children, adolescents, and adults. A number of meta-analyses have been conducted in order to synthesize these effects. Most of these studies report small to medium effects. Cason and Gillis (1993), for example, compiled studies in adventure programmes specifically for adolescents. They reported an overall non-standardized mean difference effect size of 0.31. In another study, Hans (2000) found the average effect size of locus of control comparing pre- and post-participation in an outdoor adventure programme was .36 for participants under the age of 21.

Other meta-analyses have narrowed their scope to examine interventions with specific foci. For example, Wilson and Lipsey (2000) meta-analysed evaluations of wilderness challenge programmes to reduce or prevent antisocial behaviour or delinquency. Only studies of juveniles (18 years or younger) using a control or comparison group design were eligible. Comparison groups could be either randomised or nonrandomised but, if non-randomised, had to utilize a matched comparison group or provide some evidence regarding pre-test equivalence between the treatment and comparison groups. The authors found an average mean effect size for delinquency outcomes was 0.18 which is equivalent to a recidivism rate of 29% for programme participants versus 37% for comparison subjects. The effect size for interpersonal skills was .29, locus of control was .10, self-esteem was .31, psychological adjustment was .25 and school performance was .30. All effect sizes were significant except for locus of control. Programme length was not related to outcome among short-term programmes (up to six weeks) but extended programmes (over ten weeks) showed smaller effects overall. However, the most influential programme characteristics were the intensity of the physical activities and whether the programme included a distinct therapeutic component. Programmes involving relatively intense activities or with therapeutic enhancements produced the greatest reductions in delinquent behaviour.

Another recent meta-analysis focused specifically on studies of challenge (ropes) courses, which is a frequently used tool in outdoor adventure programmes (Gillis and Speelman, 2008). Eligible studies included a control group. The authors found that the average effect size of participation was .46 for middle school age (i.e., 11 to 13 years), .38 for high school age (i.e., 14 to 18 years), and .18 for university students. They also examined the effect sizes of a number of outcomes separately but these included adults as well as children and adolescents. Medium effect sizes were reported for group dynamics ($d = 0.62$) and attitudes about physical condition ($d = 0.52$). Small to medium effect were reported for self-efficacy ($d = 0.48$), behavioural observations ($d = 0.37$), mood or personality measures ($d = 0.29$), self-esteem or self-concept ($d = 0.26$), and academic measures ($d = 0.26$). Only 27.3% of studies contained follow-up data. Where that data did exist, effect sizes were consistently lower for follow-up data when compared to post-test data. Furthermore, some of the highest effect sizes were recorded from research focused on therapeutic outcomes.

Conclusion

Overall, these studies suggest that participation in outdoor adventure programmes has small to medium effects on the psychological, behavioural, physical and academic outcomes of young people. These findings indicate that outdoor adventure programmes are a promising tool to promote the health and wellbeing of young people, especially when they are coupled with therapeutic interventions. Nevertheless, there are a few caveats to consider.

1. It is essential to consider that these programmes vary in their design as well as intention. Therefore, a wilderness programme for troubled teens will look very different to a team-building excursion in a mainstream school.
2. While meta-analytic studies provide information about the effectiveness of outdoor adventure programmes, there is much less knowledge regarding the theoretical, practical, and ethical implications of such programming. Many recreation programmes continue to rely on “black box” programming, where it seems that simple participation is assumed to lead to participant development without any ability to describe the specific mechanisms through which change may occur.
3. These programmes also need to be considered within the context of the everyday lives of young people. This is particularly relevant for children and adolescents who may be forced to participate and may also be placed in compromising conditions in unregulated programmes. Young people in such programmes may be estranged from their network of support including parents, school personnel, and friends.
4. Given the empirical findings that suggest some fade-out following intervention, aftercare is considered to be essential to any long-term therapeutic change. Russell and Hendee (1999) emphasize that “while providing for effective intervention, diagnosis and initial treatment, wilderness therapy is not a stand-alone cure” (p. 12).

4.4 Social and Emotional Learning Programmes

Background

Social and Emotional Learning (SEL) is the process of learning the skills to recognise and manage emotions, setting and achieving positive goals, appreciating the perspectives of others, establishing positive relationships, making responsible decisions, and handling interpersonal situations constructively (Elias et al., 1997). In the UK, Social and Emotional Aspects of Learning (SEAL) was created as a whole-school approach to promoting the social and emotional skills that are thought to underpin effective learning, positive behaviour, regular attendance, and emotional well-being (Department for Education and Skills, 2005). SEAL was designed to promote the social and emotional skills that have been classified under five domains including self-awareness, self-regulation, motivation, empathy, and social skills.

Target Population

SEL is designed as a universal, school-based programme to promote skills and address risks facing young people (Payton et al., 2008). SEL programmes typically target multiple outcomes, are multi-year in duration, coordinate school-based efforts with those in families and the larger community, and give children opportunities to practise positive behaviours and receive consistent reinforcement.

Implementation

SEL programmes typically aim to foster self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2005). These competencies, in turn, are expected to provide a foundation for better adjustment and academic performance as reflected in more positive social behaviours, fewer conduct problems, less emotional distress, and improved test scores and grades (Greenberg et al., 2003). The theory is that, over time, mastering SEL competencies will enable young people to avoid being influenced by negative external factors and act based on their internal values: showing care and concern for others, making good decisions, and taking responsibility for their choices and behaviours (Bear & Watkins, 2006).

SEL programmes involve two components: teaching social and emotional skills so that students learn to use them as part of their daily repertoire of behaviours; and establishing safe, caring learning environments both inside and outside the school. Together, these components promote personal and environmental resources so that students feel valued, experience greater intrinsic motivation to achieve, and develop healthy behaviours.

Programmes are likely to be effective if they use a sequenced approach, active forms of learning, focus sufficient time on skill development, and have explicit learning goals (see Durlak, 1997). These four recommended practices form the acronym SAFE (for sequenced, active, focused, and explicit). These recommended practices are more important in combination with one another rather than as independent factors.

Causal Evidence

There is a wealth of causal evidence on SEL. In the U.K., there were several national evaluations of SEAL. As part of the Behaviour and Attendance Pilot (Hallam, Rhamie & Shaw, 2006a), the whole-school development programme was evaluated. This element was designed to create the type of school ethos and climate that promote social and emotional skills, as well as teach these skills directly across the curriculum. It was found that the programme, “had a major impact on children’s well-being, confidence, social and communication skills, relationships, including bullying, playtime behaviour, pro-social behaviour and attitudes towards schools” (Hallam, Rhamie & Shaw, 2006b, p.1). Another element of SEAL involved small group interventions for children who were thought to require additional support to develop their social and emotional skills (DfES, 2006). A national evaluation showed that primary SEAL small group work had a positive impact. There were significant improvements in at least one of the domains measured, although the average effect size was small (Humphrey et al., 2008).

Another national evaluation of SEAL in secondary schools, however, revealed that SEAL (as implemented by schools in their sample) failed to impact significantly upon pupils’ social and emotional skills, general mental health difficulties, pro-social behaviour or behaviour problems (Humphrey, Lendrum, & Wigelworth, 2010). The authors conclude that “future school-based social and emotional learning initiatives should more accurately reflect

the research literature about ‘what works’ in this area – namely, the provision of structure and consistency in programme delivery, and the adherence to SAFE (Sequenced, Active, Focused, Explicit) principles; careful monitoring of fidelity in such programme delivery would be essential to ensuring more positive outcomes.”

In a large scale review of SEL which included mostly U.S. studies, Payton and colleagues (2008) summarised three large scale reviews of research on the impact of SEL programmes on children with and without behavioural problems both in school and after school settings. They found that such programmes improved students’ social-emotional skills, attitudes about self and others, connection to school, and positive social behaviour and reduced students’ conduct problems, and emotional distress. Furthermore, positive SEL programming improved students’ academic performance by 11 to 17 percentile points. Payton et al. (2008) concluded that, “Comparing results from these reviews to findings obtained in reviews of interventions by other research teams, SEL programmes are among the most successful youth-development programmes offered to school-age youth.”

There have also been several meta-analyses which have shown generally positive findings. Durlak, Weissberg, and Pachan (2008), for example, conducted a meta-analysis of After School Programmes (ASP) to promote personal and social skills in children. Results from 75 reports evaluating 69 different programmes revealed that the average effect size was .22. Significant mean effects ranged in magnitude from 0.12 for school grades to 0.34 for child self-perceptions (i.e., increased self-confidence and self-esteem). The effect sizes for positive social behaviours was .19, problem behaviours was .19, achievement test scores was .17, and school bonding was .14. The mean effects for school attendance (.10) and drug use (.10) were the only outcomes that failed to reach statistical significance.

In another large-scale meta-analysis of SEL programmes, Durlak et al. (2011) examined 213 school-based universal interventions. Studies were included in the meta-analysis if they emphasised the development of one or more SEL skills; targeted students between the ages of 5 and 18 without any identified adjustment or learning problems; included a control group; and reported sufficient information so that effect sizes could be calculated at post and, if follow-up data were collected, at least 6 months following the end of intervention. Durlak et al. found that SEL participants demonstrated significantly improved social and emotional skills, attitudes, behaviour, and academic performance compared to controls. The average effect size for all 213 interventions was .30. For individual outcomes, SEL interventions had an average effect size of .57 on social-emotional skill performance. Furthermore, SEL interventions had an average effect size of .23 on attitudes, .24 on positive social behaviour, .22 on conduct problems, .24 on emotional distress, and .27 on academic achievement.

Durlak and colleagues also found that SEL programmes led by well-trained professionals were more likely to produce change in SEL skills (ES = .87) compared to teacher-led programmes (ES = .62). However, programmes led by teachers were more likely to produce change in the other outcomes. For example, academic achievement, positive social behaviour, and emotional distress only showed significant improvement in studies where classroom teachers were responsible for delivering the intervention (as opposed to delivery by non-school personnel).

There are also indications that the effects of SEL programmes persist beyond the duration of the programme. Thirty-three of the studies (15%) collected follow-up data at least 6 months after the intervention ended. The average follow-up period across all outcomes for these 33 studies was 92 weeks (median = 52 weeks). The mean follow-up effect sizes remained significant for all outcomes in spite of reduced numbers of studies assessing each outcome: SEL skills (ES = .26), attitudes (ES = .11), positive social behaviour (ES = .17), conduct problems (ES = .14), emotional distress (ES = .15), and academic performance (ES = .32).

Conclusion

Evidence indicates that SEL programmes are not only successful at increasing children’s socio-emotional and language skills, but are also effective at fostering positive outcomes and preventing negative ones. On average, meta-analytic studies found medium to large effects on social skills and small effects on academic achievement, positive attitudes, psychological/emotional adjustment, and problem behaviours. Despite these documented effects, however, many unanswered questions remain. Most critically, there is a lack of knowledge concerning what specific skills are taught in SEL programmes. Many of the meta-analyses include evaluations focusing on a myriad of different social and emotional behaviours. Furthermore, there is little understanding of which particular SEL skills can be taught at what ages. Rigorous, longitudinal studies using multi-sites are required to address these concerns.

5. Summary and Conclusions

In this concluding section, we first summarise the evidence regarding non-cognitive skills and consider some of the areas of promise, and challenges, for further work in this field. Second, we summarise the evidence regarding the categories of interventions and pinpoint the most promising intervention types for developing non-cognitive skills. Lastly, we offer our final conclusions.

5.1 Non-Cognitive Skills

Summary of Findings

Table 1 provides a summary of our main findings concerning non-cognitive skills. As shown in Table 1, we assess for each non-cognitive skill (1) the robustness of measurement, (2) the malleability (i.e., as determined by the average effect size of its improvement in experimental studies), (3) the causal effect on other outcomes (i.e., as determined by the average effect size shown in experimental studies), and the strength of the evidence (see Appendix for a definition of these categories).

Table 1: Summary of Findings on Non-Cognitive Skills

	Quality of measurement	Malleability	Effect on other outcomes	Strength of Evidence
1. Self-Perceptions				
Self-Concept of Ability	High	Medium	Not available	Medium
Self-Efficacy	High	High	High	Medium
2. Motivation				
Achievement Goal Theory	High	Medium	Low to medium	Medium
Intrinsic Motivation	High	Medium	Low to medium	High
Expectancy-Value Theory	Medium	Not available	Medium to high	Medium
3. Perseverance				
Engagement	Medium	Not available	Not available	Low
Grit	Medium	No evidence	No evidence	Low
4. Self-Control	Medium	Low to medium	Low	Medium
5. Meta-Cognition	Medium	Medium to high	Medium to high	High
6. Social Competencies				
Leadership Skills	Low	Not available	No evidence	Low
Social Skills	Medium	Medium to high	Low to medium	High
7. Resilience and Coping	Medium	High	Low	Medium
8. Creativity	Medium	Not available	No evidence	Low

As shown in Table 1, several non-cognitive skills suggest a medium to high degree of malleability and modest causal effect on other outcomes, including self-efficacy, achievement goal theory, meta-cognitive strategies, and

social skills. There is also causal evidence suggesting that expectancy-value theory may be a key motivational factor to consider especially for low-achieving students with low expectations. There is promising evidence that these non-cognitive skills can be developed in children and young people through intervention, and that this, in turn, may lead to other positive outcomes. The evidence is strongest in relation to improved academic outcomes; the evidence of impact on broader, longer-term outcomes, e.g., employment, is much weaker.

There is varying evidence that other non-cognitive skills such as self-concept of ability, coping skills, and leadership may be promoted in young people, but there is no experimental evidence that their improvement has a substantial causal effect on other outcomes. Self-concept of ability has been shown to have a reciprocal rather than causal relationship with performance, for example (Marsh & Craven, 2006). Interventions, furthermore, have been shown to foster coping skills, leading to reduced anxiety and psychological distress, however there is no evidence yet of impact on wider outcomes. There are several correlational studies suggesting that leadership can be improved. However, there is little or no evidence that enhancements predict positive outcomes later. Nevertheless, these non-cognitive skills should not be dismissed as unimportant. More evidence needs to accumulate on how these factors may either enhance and/or go hand-in-hand with the development of other non-cognitive skills.

Some non-cognitive skills, such as intrinsic motivation and engagement, appear to be more context-specific factors rather than stable individual characteristics. While there is a wealth of evidence that intrinsic/extrinsic motivation can be manipulated and such changes can have subsequent effects on achievement and effort, research suggests that the intrinsic/extrinsic dichotomy is highly dependent on the instructional context. This is also true for school engagement. While there is little experimental evidence, there is an abundance of correlational findings suggesting that the school environment plays an important role in students' emotional, behavioural and cognitive engagement. These factors represent a significant area to consider for school interventions and are a promising field for future studies.

The remaining factors including grit, self-control, and creativity seem to be more akin to personality traits than malleable skills. Research indicates that grit is correlated with achievement, yet these studies have focused on higher-achieving older children and university students, almost exclusively. There is no experimental evidence to date that grit can be fostered. There is some evidence that self-control may be improved for younger children, however, the extent to which it predicts cognitive ability is unclear. Creativity may also be enhanced in certain conditions, yet there is no real evidence that such interventions are long-lasting and have an impact on other outcomes.

Conditions for success

There does not seem to be one, single non-cognitive skill that shows strong causal effects across different outcomes. Rather, multiple skills are inter-related, and the significance of different non-cognitive skills depends on several factors. First, the relevance of different non-cognitive skills varies depending on the domain in question. Therefore, enhancement in one area may not translate to improvement in others. For example, increasing academic self-efficacy may not entail greater self-efficacy in other contexts, such as behavioural adjustment, sports, music, or civic engagement.

The developmental age of the child or adolescent is another important issue in the consideration of non-cognitive skills. For instance, self-control interventions have shown small but significant effects. However, there is evidence to suggest that self-control may only be malleable up to age 10. Furthermore, research suggests that programmes focused on improving meta-cognitive or coping strategies need to be adapted to the developmental age of the child.

Context also plays an important role in non-cognitive skills. The development and maintenance of non-cognitive skills are optimised when the environment supports and reinforces these competencies. Young people also need opportunities to use and generalise their newly learned skills in real-world settings (CASEL, 2003), which is for example achieved through the experience of service learning.

Lastly, a key issue is the interplay among different non-cognitive skills, particularly among self-perceptions, motivation, perseverance, and meta-cognition. While engaged in an activity, young people continuously assess their interest in, and the meaningfulness of, the task. Their beliefs about their own abilities guide the level of effort and persistence they put forth to complete a task and their use of meta-cognitive strategies. Students' attributions—the factors students attribute to their success or failure for a specific task—play a key role in their decision-making concerning whether or not they will engage in an activity and use meta-cognitive strategies for

similar activities in the future. When children and young people believe they can accomplish a task and are motivated, they are more likely to invest the necessary time and effort needed to learn and apply appropriate meta-cognitive skills and complete the task successfully (Zimmerman, 2000). It is therefore not sufficient to raise self-efficacy beliefs, it is also important to increase the value and interest of specific tasks the child or young person is going to engage in.

5.2 Interventions

Summary of Findings

Table 2 provides a summary of our main findings concerning interventions. As shown in Table 2, we assess for each intervention: (1) the target population (2) the location, (3) the target age and (4) the size of the causal effect on other outcomes (i.e., as determined by the average effect size shown experimental studies) (see Appendix for a definition of these categories).

Table 2. Summary Table of Findings on Interventions

Intervention type	Target Population	Location	Target Age	Effect on Other Outcomes
Mentoring	Selected	Community-Based*	School-Age	Low
Service Learning	Universal	School-Based**	School-Age / University	Low to Medium
Outdoor Adventure	Universal, Selected	Outdoors	Older children / Adolescents	Low to Medium
SEL	Universal	School-Based	School-Age	Low to Medium

*Findings suggest that community-based compared to school-based programmes have larger effects. **Findings suggest that school-based compared to community-based programmes have larger effects.

There is experimental evidence that mentoring, service learning, outdoor adventure and SEL programmes can both promote positive and prevent problematic behaviours. In general, service learning, outdoor adventure and SEL programmes show low to medium effects on a variety of outcomes, with mentoring having low overall effects. However, it is important to highlight that the vast majority of the evidence base stems from the U.S., with only a few studies from the U.K. context. The issue of transferability of findings needs to be given clear consideration here. It has been suggested, for example, that although most of the interventions described in this review would be applicable in the U.K., they would require some adaptation in order to be apposite (Blank, 2009).

Conditions for success

The selection of an intervention strategy should reflect the needs and resources of the school/community and the specific target group and/or problems areas at hand. Mentoring programmes appear to work best for at-risk school-age children. Mentoring can be implemented in a school or community, but community-based programmes show larger effects perhaps because relationships extend beyond the school year. Service learning, on the other hand, offers a universal programme which can be implemented in either a school or community setting. It has significant effects for all ages, but curricular approaches that emphasise reflection have higher effects than non-curricular approaches. Outdoor Adventure programmes are appropriate for older children, adolescents, and adults and provide a promising tool to promote the health and wellbeing of troubled young people, especially when they are coupled with therapeutic interventions. SEL programmes have been shown to enhance positive outcomes for a universal school-aged population. They are easily and effectively administered by school staff.

It is also important to note that the most important consideration, in the implementation of any intervention programme, is its execution. Well-executed programmes conducted by high quality staff will have greater effects than those with implementation problems. An effective intervention can be conceptualised as one that supports the basic needs of the developing person, including their competence, connections, character, confidence and contribution to society, the 5 C's of Positive Youth Development (Lerner et al., 2005).

Given these considerations, we conclude that service learning has the potential to enhance the non-cognitive skills which we highlighted, in particular, self-efficacy, motivation, meta-cognitive strategies, and social skills. In a curricular-based approach, which includes a reflective element, young people of all ages can benefit from this intervention strategy. Four key aspects of an effective service learning provision include: i.) having a curriculum-based approach where the intervention has clear goals that align with the curriculum and containing corresponding activities to match those goals; ii.) involving reflection where young people can assess their experiences (e.g., using journals, having discussions in class or in small groups, writing essays about the service experience, presenting to the class what was learned, or reflecting individually with the teacher or site supervisor); iii.) giving students or young people a voice and involving them in the planning, decision-making, implementation, or evaluation process of the programme; and iv.) ensuring community involvement where the community has a part in the programme besides providing a place for students to serve. It is possible that social skills training may also be incorporated into such a programme, using a SEL framework to enhance social skills even further.

5.3 Conclusions

Current debate on non-cognitive skills sometimes implies that there is one key factor – whether, grit, self-control or resilience – that is the “key to success” for young people, and that it is this crucial ingredient that enables them to succeed over and above cognitive ability or test scores, to overcome disadvantage and flourish even in the face of serious adversity. Whilst this narrative is right to emphasise the importance of non-cognitive factors in determining outcomes for young people, our review finds that there does not seem to be one non-cognitive skill that is the crucial “silver bullet” that predicts positive outcomes for young people. Rather, there are many skills that are inter-linked and the enhancement of one of these skills without improvement of the others is unlikely to lead to lasting changes.

The evidence is compelling that there are strong *associations* between non-cognitive factors and positive outcomes for young people. Measurable factors such as self-control and school engagement are correlated with positive outcomes in the future such as academic attainment, improved finances in adulthood, and reduced crime. But as this review shows, robust, causal evidence of impact on long-term outcomes is much more limited. Most experimental studies look at single non-cognitive skills in isolation, and over relatively short timeframes. So far, the evidence is relatively weak on whether improvements to non-cognitive skills are transferable across domains, and are sustained into the future.

That said, there are significant signs of promise. When developed in combination, skills such as self-efficacy, motivation, and meta-cognitive strategies appear to be influential in improving academic learning and success in children and young people. Future studies should provide more of an empirical basis of their impact on outcomes other than academic achievement, especially regarding those which are longer-term. Social skills, in addition, have been found to be an important factor. Programmes that foster social development, have been shown to have low to moderate effects on associated skills, including positive self-perceptions, social and emotional adjustment, and academic achievement. Service learning programmes, in particular, have the potential to foster this group of non-cognitive skills for young people of all ages.

Discussion of non-cognitive skills is complicated and contested. There is little agreement even on whether ‘non-cognitive skills’ is the right way to describe the set of issues under discussion, and terms such as ‘character skills’, ‘competencies’, ‘personality traits’, ‘soft skills’ and ‘life skills’ are also widely used. Within any given concept such as ‘resilience’ or ‘motivation’ there is a long history of theory and measurement, and competing definitions of what is being discussed and measured. Given this complexity, it is little surprise that debate sometimes becomes focused on a simple, single measure of potential. What this review suggests, ultimately, is that it is essential to keep a broad view, and consider non-cognitive skills in combination. We argue that despite significant gaps in the evidence, there are areas of promise, and that further, long-term studies will help to build the case for investing in the development of non-cognitive skills and improving outcomes for young people.

6. References

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Appendix

Definitions for Table 1

Robust Validated Measurement. High = widely used validated measures; Medium = at least one validated measure; Low = measures with questionable psychometric properties.

Malleability. High = large effect size from pre to post ($d = .80$ to $.50$); Medium = medium effect size ($d = .50$ to $.20$); Low = low effect size ($d = .20$ or less); Not Available = limited experimental evidence but no effect sizes available, No Evidence = correlational evidence only.

Causal effect on other outcomes. High = large effect size from pre to post ($d \geq .80$); Medium = medium effect size ($d < .50$); Low = low effect size ($d < .20$); Not Available = limited experimental evidence but no effect sizes available, No Evidence = correlational evidence only.

Strength of Evidence. High = several large scale meta-analyses of experimental studies; Medium = few experimental studies; Low = limited number of quasi-experimental or correlational studies.

Definitions for Table 2

Category. Universal = target the general public or a whole population group that has not been identified on the basis of individual risk; selective = focus on individuals or population subgroups who have biological, psychological, or social risk factors, placing them at higher than average likelihood of developing a mental disorder; and indicated = target high-risk individuals with detectable symptoms or biological markers predictive of mental disorder but do not meet diagnostic criteria for disorder at the present time.

Strength of Evidence of Causal Effect. Large = large effect size on other outcomes ($d = .80$ to $.50$); Medium = medium effect size ($d = .50$ to $.20$); Low = low effect size ($d = .20$ or less).



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