TASO
Transforming Access
and Student Outcomes
in Higher Education

Rapid review:

Intermediate outcomes for higher education access and success

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CONTENTS

GLOSSARY

Term	Definition
Causal	A change in one variable causes a change in the other variable, allowing the researcher to determine its impact.
College	In a UK context, further education colleges tend to offer courses that are more vocational than the degree courses offered at universities (higher education). In a US context, college is equivalent to higher education in the UK.
Construct	In psychology, a construct is a hypothetical label for a domain of behaviours; for example, motivation or self-esteem.
Correlation	A connection between two or more variables, such as attainment and university progression. Note, the presence of a correlation does not necessarily mean the connection between the factors is causal.
Effect size	An effect size is a statistically calculated value measuring the strength of a relationship between two variables.
Grade Point Average (GPA)	GPA is the average measure of a student's academic scores across a period of time in US colleges. It is frequently used to measure attainment in US-based research.
Higher education (HE)	In the UK, HE is the level of education that follows secondary school, taking place at universities or further education colleges.
Intermediate outcome	An intermediate outcome is the behaviour, attitude, knowledge, or skill that an intervention aims to influence.
Likert scale	A Likert scale measures attitudes to a topic by providing possible answers along a continuous scale (for example, from 'strongly disagree' to 'strongly agree'). It is a common way of measuring responses in questionnaires.
Long-term outcome	A long-term outcome is the long-term result that an intervention aims to cause, such as entering HE or raising attainment.
Measure	A measure is a way to capture an outcome and can produce quantitative or qualitative data. For example, a measure could be a questionnaire or a test.
Meta-analysis	In academic research, a meta-analysis is a statistical analysis that combines the results of multiple studies on the same subject to determine overall trends.
Scale	A questionnaire scale is a set of items (statements/questions and response options) that together measure a specific outcome in participants.
Questionnaire item	A questionnaire item is a statement or question, and a response option used to measure a participant's response to a particular topic.
Questionnaire validation	Questionnaire validation is a multi-step process to ensure that a questionnaire measures the outcome it intends to measure, does so reliably, and generates high-quality data.

INTRODUCTION

Equality gaps in HE are complex and persistent. The HE sector faces ongoing challenges in understanding whether efforts to close these gaps are working. One such challenge is developing robust ways to assess progress towards longer-term goals for widening participation and student success.

Earlier this year, the Centre for Transforming Access and Student Outcomes in HE (TASO) commissioned The Brilliant Club and researchers from the University of Cambridge to identify appropriately validated outcomes along the path to eliminating equality gaps and develop robust scales to evaluate them.

From the research literature, we know that several key intermediate outcomes are associated with both progression to, and success at, HE. Although pre-existing scales could be used to measure these constructs and evaluate HE access activity, many are not fit for their intended purpose.

This rapid review provides an overview of the intermediate outcomes that are most important for access to and success in HE and outlines how these outcomes can be measured using existing scales from the research literature.

This work has been coupled with the design and validation of a multi-scale questionnaire that can be used across widening participation and student success teams. The validated questionnaire contains a set of questionnaire items (statements or questions), which have been through a multi-step process to ensure they capture the specific outcomes they set out to capture, do so reliably, and generate good quality data. Using a validated questionnaire scale in your evaluation will contribute to the quality of your data, and therefore to the quality of the insight you can draw about your programme from your evaluation.

The rapid review was conducted between January and February 2022.

OVERVIEW

The context: The term 'intermediate outcomes' is used to refer to outcomes that occur following a targeted intervention or activity, and may include changes in behaviour, attitude, knowledge or skill. It is important to identify empirical evidence that an intermediate outcome is associated with positive changes in the relevant long-term outcome. In the case of widening participation (WP), this is often attainment and progression to HE. However, more recently, success in HE (e.g. retention, degree classification) has also been cited as a key long-term outcome, consistent with a more comprehensive definition of HE access and success.

Ensuring that we have robust measures to assess intermediate outcomes is important in understanding the impact of WP activities. The research literature uses a range of existing scales that measure specific intermediate outcomes. Often, these scales have been developed for broader educational purposes and validated using school and/or university student populations. They tend to be Likert scales, in which individuals self-report the extent to which they agree or disagree with attitudinal and/or behavioural statements, and have the potential to be adapted and applied to evaluating WP activities.

Our approach: We evaluated the relevance of intermediate outcomes by examining their connection to attainment, as well as to the long-term outcomes of HE progression and retention where these were available. We include attainment as an outcome of interest because evidence shows that when GCSE attainment is taken into account, the gap in HE participation between the richest and poorest students is reduced to zero, suggesting that the difference in the likelihood of going to university between these two groups can be entirely explained by GCSE performance (Crawford et al., 2016). Attainment is therefore an important predictor for university progression. In addition, on a practical level, a larger body of research examines the connection between intermediate outcomes and attainment than between intermediate outcomes and HE progression and retention. For this reason, empirical studies on attainment formed a significant part of the review. It is important to note that the majority of the research evidence reviewed was correlational, not causal.

For each intermediate outcome, we present a definition, evidence of its link to attainment (and to HE progression and retention, where this was available), and an overview of existing measurement instruments (e.g. questionnaire scales). The outcomes were grouped into one of four categories:

1. **Cognitive and metacognitive outcomes:** the mental processes that underpin learning (attention, memory, decision-making, self-regulation).

2. **Motivational outcomes:** the degree to which individuals are engaged in their learning, including in the face of setbacks.

3. **Self-perceptions:** individuals' feelings about their academic abilities and their levels of confidence.

4. **Social outcomes:** individuals' perceptions of how they belong in HE and the extent to which they belong at university.

Evidence of outcomes and existing measurement scales were sourced by searching Google Scholar, Taylor & Francis Online, the RAND Education Assessment Finder and the Education Endowment Foundation (EEF) Spectrum database, and also drew upon previous research undertaken by the authors. We prioritised measures that used Likert scales as we recognised that this would be the most accessible format for the WP sector, allowing comparisons across different activities. We provide additional information where Likert scales are not the norm or alternatives are preferred. In the following, we refer to HE provision as widely and broadly defined. We occasionally use 'US college' to specify that specific evidence has been derived in an American context; otherwise 'college' refers to further education colleges.

How to use this review

This review is a research summary about intermediate outcomes: how they are measured and the extent to which they are associated with HE access and success outcomes. It should be noted that, while the review is not exhaustive, it is comprehensive with 15 intermediate outcomes reviewed in total. A summary table is provided at the beginning of the review. In the body of the review, we discuss definitions, evidence and measures for each outcome. At the end of the review, we explain the next steps for the Survey Validation Project. To maximise the benefit derived from the review, we recommend using it as follows:

1. The summary table at the start of the report can be used to gain a brief overview of the intermediate outcomes included in the review and helps gain an initial steer on the range of outcomes that can be addressed and evaluated in WP interventions and activities.

2. The definitions can be used to check how intermediate outcomes can be meaningfully expressed. This is particularly important given the frequent inconsistencies and inaccuracies in how certain outcomes are used in access and success work. We hope this review will help to build a shared narrative for WP practitioners and researchers evaluating the same intermediate outcomes.

3. The evidence provided can be used to help justify why specific intermediate outcomes have been chosen for an institution's access and success work. This may be especially helpful when evidencing the evaluation approach.

4. The measures listed can be used to better understand the questionnaire scales available for specific outcomes and to understand the limitations of 'off-the-shelf' scales.

5. The summary can be used to understand the most promising intermediate outcomes for WP interventions and activities, based on the evidence detailed in the review.

RAPID REVIEW SUMMARY TABLE

Outcome	Definition	Evidence	Measures
COGNITIVE & METACOGNITIVE OUTCOMES			
Critical thinking	Critical thinking skills can be defined as purposeful reflection, logical reasoning and the ability to construct and evaluate arguments and engage in reflective scepticism. Critical thinking dispositions refer to an attribute or habit of mind that is integrated into one's beliefs or actions.	The ability to think critically is a strong predictor of academic achievement in children and adults, and successful life decisions in general.	Critical Thinking Disposition Scale (Sosu, 2013)
Metacognition	The ways learners monitor, plan and direct their learning.	At both school and university, metacognitive strategies contribute significantly to attainment and can be improved through intervention.	Junior Metacognitive Awareness Inventory (Sperling et al., 2002) Motivated Strategies for Learning Questionnaire: Learning Strategies and Metacognitive Strategies subscales (Pintrich et al., 1991) Social-emotional Self-regulatory Competence Measure (Oyserman et al., 2021) The Need for Cognition Scale (Cacioppo & Petty, 1982)
Oracy & communication skills	The speaking and listening skills, behaviours and language necessary for effective communication and collaboration.	Oracy skills are important for stimulating children's cognitive development, particularly in primary school.	Cambridge Oracy Assessment Toolkit (Mercer et al., 2017)
Study strategies	The activities necessary to organise and complete schoolwork tasks and to prepare for and successfully take tests.	Attainment is higher when students employ study strategies in an intentional, task-dependent way. The most effective study strategies are practice testing and distributed practice.	Study Habit Survey (Hartwig & Dunlosky, 2012) Undergraduate Students' Study Habits Survey (Kornell & Bjork, 2007) Inventory of Learning Styles (Vermunt, 1994)
MOTIVATIONAL OUTCOMES			
Academic engagement	Academic engagement is the extent to and way in which students are actively involved in their schooling or HE studies, and comprises cognitive, behavioural and emotional engagement.	There is mixed evidence for the relationship between academic engagement and attainment, as engagement is an outcome of situational context rather than an individual characteristic.	Student Engagement Instrument (Appleton et al., 2006) University Student Engagement Inventory (Maroco et al., 2016)
Goal orientation	Goal orientation refers to whether students are focused on learning to gain competence for themselves (achievement goal orientation) or on demonstrating their competence to others (performance goal orientation).	There is mixed evidence for the importance of goal orientation in attainment, and it is likely to be mediated through self-efficacy.	Patterns of Adaptive Learning Scale – Goal Orientation Scales (Midgley et al., 2000)

Outcome	Definition	Evidence	Measures
Grit & resilience	Grit is defined as a person's trait-level perseverance and passion for their long-term goals. Resilience refers to positive adaptation despite the presence of risks such as poverty, parental mental illness or abuse. Resilience is not necessarily a skill that can be improved but is a dynamic process, whereas grit focuses on whether individuals continue to persist in the face of minor setbacks.	Resilience is linked to improved self-regulation, which is related to higher attainment and lower rates of university dropout. However, resilience is difficult to improve as it is highly dependent on previous life experiences and external support. Higher levels of grit are related to higher attainment and a lower probability of dropping out of education. However, there is a lack of evidence on how to increase levels of grit.	The Academic Buoyancy Scale (Martin & Marsh, 2008) The Child and Youth Resilience Measure (Renbarger et al., 2020) The Effort and Diligence Measure (Mendolia & Walker, 2015) The Grit Scale (Duckworth & Quinn, 2009)
Locus of control	The extent to which students believe their future success depends on their skills and effort (internal locus) or chance, immutable structures and the actions of others (external locus).	Multiple studies have found a positive relationship between internal locus of control and higher attainment. There is some evidence that an internal locus of control is also related to a more effective adjustment to university.	Career Locus of Control Scale (for adolescents) (Millar & Shevlin, 2007) Multidimensional Measure of Children's Perceptions of Control (cognitive domain items) (Connell, 1985) Tertiary Student Locus of Control Scale (Santokhie & Lipps, 2020)
Mindset	Mindset refers to whether students believe their qualities and abilities can be altered through effort (growth vs. fixed mindset).	There is good evidence for a positive relationship between a growth mindset and attainment. However, this relationship is often stronger for students facing academic setbacks.	Implicit Theory of Intelligence Scale for Children (Blackwell et al., 2007)
Motivation	Students' investment in their learning and their desire to learn and master the learning material, encompassing the underlying 'why' of behaviour.	Higher levels of extrinsic motivation and amotivation are associated with lower attainment, while higher intrinsic motivation is associated with higher attainment and higher course retention at university.	Motivated Strategies for Learning Questionnaire (MSLQ) Intrinsic/Extrinsic Motivation subscale (Pintrich et al., 1991) Identity-based Motivation Measure (Oyserman et al., 2021) The Academic Motivation Scale (Vallerand et al., 1992)
SELF-PERCEPTIONS		
Self-concept	Academic self-concept is an evaluative self-perception that is formed through the student's experience and interpretation of the school environment. Self-concept is based on self-evaluation in relation to others, while self-efficacy is based on self-evaluation of past performance.	Students with higher academic self-concept (who perceive themselves as academically competent) have been found to have higher attainment because they are more autonomously motivated.	Academic Self-Concept Scale (Reynolds, 1988) Personal and Academic Self-Concept Inventory (math and verbal ability items) (Fleming & Whalen, 1990) Self-Description Questionnaire (academic items) (Ellis et al., 2002)

Outcome	Definition	Evidence	Measures
Self-efficacy & confidence	Self-efficacy is the belief in one's ability to plan and execute the skills necessary to produce a certain behaviour; it is a more specific outcome than confidence.	In meta-analyses, academic self-efficacy consistently emerges as the strongest correlate of attainment in HE. Part of this high correlation can be attributed to the fact that prior attainment affects both self-efficacy and subsequent attainment.	Academic Behavioural Confidence Scale (Sander & Sanders, 2009) Core Districts Social-Emotional Learning Survey (self-efficacy items) (West et al., 2018) MSLQ Self-Efficacy for Learning and Performance subscale (Pintrich et al., 1991) Students' Approaches to Learning (Marsh et al., 2006) The Readiness and Expectations Questionnaire (Jansen & van der Meer, 2012)
SOCIAL OUTCOMES			
HE aspirations & expectations	Aspirations encompass all that children and young people hope to achieve for themselves in the future, while expectations add a dimension of achievability – whether young people believe they can achieve them and will be allowed to do so.	Evidence shows that young people from all backgrounds have high aspirations for themselves, but those from lower socioeconomic backgrounds have lower expectations that these will be achievable. Expectations are influenced by a complex set of external factors.	Students' Intentions Towards University (Vardy et al., 2020) The Brilliant Club university expectation items University expectations and experience questionnaires (Lowis & Castley, 2008)
Sense of belonging	The extent to which a student feels connected to the HE environment, peers, faculty and others in college, and is involved in 'campus' activities.	University students with a higher sense of belonging are more likely to persist in their studies and achieve higher academically. There is a lack of evidence on how to improve a sense of belonging prospectively (before students enter HE).	King's College London sense of belonging measure: The Big 6 (Nwosu et al., 2021) The Social Integration and Persistence Intentions Scale (Pascarella & Terenzini, 1980) Uni Connect (formerly NCOP) Perceptions of HE (CFE Research, 2019)
Social and cultural capital	Social capital refers to social networks and connections that can provide access to social goods, such as educational benefits and status. Cultural capital refers to legitimised knowledge present in the home environment, taking the form of behaviour, dispositions and knowledge internalised through socialisation processes and investment in education and training.	Research has shown that students who lack access to the social and cultural capital valued by the dominant social classes are limited in their educational outcomes. However, this is due to differences in attainment between these groups, not directly caused by social and cultural capital.	N/A

1. COGNITIVE & METACOGNITIVE OUTCOMES

1.1 Critical thinking

Definition

Critical thinking skills can be defined as purposeful reflection and logical reasoning (Paul & Nosich, 1992), the ability to construct and evaluate arguments (Facione, 1986) and the ability to engage in reflective scepticism (McPeck, 1981). Critical thinking skills can be assessed at either a subject-specific or a general level. In contrast, critical thinking dispositions refer to an attribute or habit of mind that is integrated into one's beliefs or actions (Profetto-McGrath et al., 2003). Critical thinking is linked to a range of similar skills, including metacognition, problem-solving and higher-order thinking (Bangert-Drowns & Bankert, 1990).

Evidence

In the UK, critical thinking is identified as a primary learning outcome of HE. Staff in universities identify analysis and evaluation – key elements of critical thinking – as important skills for undergraduate students to develop (Bellaera et al., 2021). The research literature also shows that improvements in critical thinking are more likely to occur when activities focus on content related to a specific course (Renaud & Murray, 2008).

Being able to think critically is a strong predictor of attainment for both children and adults, and successful life decisions in general (Ren et al., 2020). Despite its importance, developing critical thinking is not an easy task and schools tend not to offer explicit instruction in critical thinking (Pithers & Soden, 2000). Research has also indicated that students' background is a principal factor contributing to critical thinking skills, and that individuals from poor or less affluent backgrounds are less likely to increase these skills while at university (Cheung et al., 2001).

Measures

Critical thinking dispositions, like many other dispositions, are not easily malleable and are thus less likely to be the target outcome for specific interventions. In contrast to the many measures of critical thinking skills, there are few measures of critical thinking dispositions, and they are based on attitudinal-type measures rather than test-like instruments. Specifically, we have identified one scale developed in the UK for HE (graduate) students, called the Critical Thinking Disposition Scale. This may be relevant when evaluating student success interventions but would need adaptation for undergraduate populations.

Most measures for critical thinking skills have been tested for use in a US context and are intended for commercial purposes only. The test format is based on multiple-choice questions, not Likert scales. Due to the overlap between metacognition and critical thinking, we would recommend using the measures for metacognition described in Section 1.2 as a proxy for measuring critical thinking skills.

Scale	Sample items	Comments
Critical Thinking Disposition Scale (Sasu, 2013)	I use more than one source to find out information for myself. I am often on the lookout for new ideas. I usually check the credibility of the source of information before making judgements.	This scale measures individuals' disposition towards critical thinking, including critical openness and reflective scepticism. It has been psychometrically validated on graduate students in the UK. Participants respond to 11 items on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

1.2   Metacognition

Definition

Metacognition describes how learners monitor and direct their learning and comprises two components (Lai, 2011):

- **Metacognitive knowledge:** knowledge about oneself as a learner and the factors that might impact performance, knowledge about study strategies and metacognitive strategies, and knowledge about when and why to use these strategies.

- **Metacognitive regulation:** monitoring of one's cognition including planning activities, awareness of comprehension and task performance, and evaluation of monitoring processes and strategies.

Evidence

At both school and university levels, metacognitive strategies contribute significantly to attainment, as explained below. In the context of this review, no research was found that investigated the direct relationship between metacognition and HE progression.

For primary-school-aged learners, a meta-analysis found that self-regulated learning interventions increased the use of metacognitive strategies and

that interventions were most effective when they included feedback and reflection on the use of such strategies (Dignath et al., 2008). In the UK school context, a whole-school intervention focused on metacognition resulted in a significant narrowing of the attainment gap between Year 9 students from disadvantaged backgrounds and their more advantaged peers compared to the control group (Mannion & Mercer, 2016).

There is also a substantial body of evidence around the benefits of using metacognitive strategies in HE. A systematic review of meta-analyses found that the higher a student's attainment, the more that student responds to challenging academic situations with persistence and effort (Schneider & Preckel, 2017). A study with university students found positive correlations between metacognition and attainment, both in terms of end-of-course grades and cumulative GPA (Young & Fry, 2008).

As demonstrated by a study conducted in the US, metacognitive strategies can be improved. Students participating in an intervention aimed at increasing strategic learning had higher GPA scores than the general population (Weinstein et al., 2000). University WP interventions that incorporate study strategies and subject-based teaching can, therefore, benefit from including metacognitive training.

Measures

Scale	Sample items	Comments
Junior Metacognitive Awareness Inventory (Sperling et al., 2002)	I think about what I need to learn before I start working. I use different learning strategies depending on the task. I occasionally check to make sure I'll get my work done on time.	Participants rate 12 or 18 statements on a 3- or 5-point Likert scale, depending on their age, ranging from 'never' to 'always'. This scale was developed specifically for measuring younger students' metacognitive learning strategies. The validity and reliability of the scale have been established.
MSLQ Learning Strategies and Metacognitive Strategies subscale (Pintrich et al., 1991)	When I become confused about something I'm reading for this class, I go back and try to figure it out. If course materials are difficult to understand, I change the way I read the material. Before I study new course material thoroughly, I often skim it to see how it is organised.	The MSLQ is a self-report instrument designed to assess university students' motivation and study strategies for US college courses. Participants rate statements on a 7-point Likert scale from 'not at all true of me' to 'very true of me'. It has a good factor structure and predictive validity. Participants rate how often the statements are true for them on a 4-point scale ranging from 'rarely' to 'almost always'. The scale does not appear to have been validated in further research.

Scale	Sample items	Comments
Social-emotional Self-regulatory Competency Measure (Oyserman et al., 2021)	I work hard. If I can't figure something out, I try different solutions until one works. I set high standards for myself.	Participants rate how often the statements are true for them on a 4-point scale ranging from 'rarely' to 'almost always'. The scale does not appear to have been validated in further research.
The Need for Cognition Scale (Cacioppo & Petty, 1982)	I like to have the responsibility of handling a situation that requires a lot of thinking. Thinking is not my idea of fun.	This scale measures the tendency of an individual to engage in and enjoy thinking. It has 18 items assessed on a 9-point Likert scale (+4 = very strong agreement to -4 = very strong disagreement). 5-point scale versions have also been used.

Other metacognition scales exist, particularly from the earlier part of the 1990s, but they overlap substantially with those noted in the table above and have often been superseded by the better-evidenced and better-validated scales we have identified.

1.3   Oracy and communication skills

Definition

Oracy can be defined as the range of speaking and listening skills, behaviours and language necessary for effective communication and collaboration. Oracy skills encompass physical, linguistic, cognitive and socio-emotional aspects of learning (Mercer et al., 2017).

Communication can be defined as a process of exchanging information, from the person giving the information through verbal and non-verbal methods to the person receiving the information (Iksan et al., 2012).

Evidence

Researchers in developmental psychology, linguistics and education have emphasised the importance of communication in stimulating children's cognitive development, and the use of communication as both a cognitive and social tool for learning and social engagement (Mercer et al., 2017). In compulsory school settings, while there is growing evidence on oracy skills, this often focuses on student–teacher interactions and 'classroom talk', such as teachers' use of questions (Mercer & Dawes, 2014).

The topic of communication and oracy skills is still underexplored in HE settings, and particularly in the field of WP, with little evidence to draw from. Iksan and colleagues (2012) have highlighted the importance of communication skills for labour market entrance, especially during the job-seeking process, suggesting that universities should ensure graduates are equipped with the ability to communicate clearly and effectively. A similar case can be made for the importance of students being able to express themselves clearly in university admissions interviews.

Measures

Scale	Sample items	Comments
Cambridge Oracy Assessment Toolkit (Mercer et al., 2017)	Map: Students were given a map of a 'Treasure Island' and asked to plan a route from a port to a pirate's treasure hoard. Talking Points: A set of controversial statements about a topic that students were asked to consider together and decide whether, and why, they agreed or disagreed with the view expressed. Presentation: Students had to give a 2-minute presentation to the camera.	The Cambridge Oracy Assessment Toolkit includes assessment tasks and procedures for use by teachers, together with a Skills Framework for identifying the range of skills involved in using talk in any specific social situation. The framework has four main categories to represent the different types of skills involved in the effective use of spoken language including physical, linguistic, cognitive, social and emotional. Tasks were then devised to allow teachers to make initial assessments of student skills and progress at the end of the year. Video review sessions with researchers, project teachers, the project expert panel and a new panel of independent teachers were used to test the reliability of the rating scale.

1.4   Study strategies

Definition

Study strategies are the activities necessary to organise and complete academic tasks (before and during HE) and to prepare for and take tests, including self-testing, time management and elaboration (Robbins et al., 2004). An important aspect of study strategies is the ability to carry them out independently – self-regulated study – including making decisions on what to study, how long to study and how to study (Kornell & Bjork, 2007).

Evidence

Previous studies have shown that university and secondary school students often engage in sub-optimal study strategies that do not maximise long-term learning. Karpicke and colleagues (2009) found that the majority of students engage in re-reading (repeatedly reading their notes or textbook), despite the limited benefits of this strategy, while relatively few engage in self-testing or retrieval practices. McCabe (2011) showed that the majority of undergraduate students are ignorant of existing study strategies that could benefit their memory and performance, suggesting

that training students in applied learning and memory would benefit metacognitive judgement.

A review by Dunlosky and colleagues (2013) compared the effectiveness of 10 study strategies that are commonly used by students and easy to implement. They found that the most effective were practice testing and distributed practice, and the least effective were summarising, highlighting and re-reading. Further, a systematic review of meta-analyses found that university students' attainment is higher when they employ a strategic approach to learning (Schneider & Preckel, 2017). This involves using effective study strategies and basing the choice of study strategy on the task at hand, for example using practice testing if the goal is to retain information. In contrast, adopting a surface approach to learning by skimming information and focusing on external rewards had a negative correlation with attainment. While effective study strategies are clearly linked to attainment at school and university, there is a lack of research directly linking the use of study strategies to HE progression. WP interventions could, therefore, focus on improving the study strategies that will offer the greatest benefit to students at university, such as practice testing and a strategic approach to learning.

Measures

Scale	Sample items	Comments
Study Habit Survey (Hartwig & Dunlosky, 2012)	During what time of day do you believe your studying is (or would be) most effective? Which of the following best describes your pattern of study? What is your current college GPA?	The survey included twelve questions to assess study habits and a self-reported measure of the participants' GPA. The first eight questions stem from the undergraduate students' study habits survey below, while the additional four questions aimed to address how students scheduled their study time. Each participant's study strategy was derived from the questionnaire (including self-testing, re-reading and scheduling of time) and compared to GPA. The scale does not seem to have been validated.
Undergraduate Students' Study Habits Survey (Kornell & Bjork, 2007)	Would you say that you study the way you do because a teacher (or teachers) taught you to study that way? How do you decide what to study next? Do you usually return to course material to review it after a course has ended?	This survey was administered to US college students to investigate their beliefs and strategies in managing their real-world studying. It includes eight items with multiple-choice response options. The scale does not appear to have been validated although it has been used for further research.

Scale	Sample items	Comments
Inventory of Learning Styles (Vermunt, 1994)	To test whether I have mastered the subject matter, I try to think up other examples and problems besides the ones given in the study materials or by the teacher.	The title of the measure does not reflect a lay understanding of 'learning styles'. The measure includes a range of concepts, measured either through Likert-type items or behavioural frequency items. Subscales may be used independently of one another.

2. MOTIVATIONAL OUTCOMES

2.1 Academic engagement

Definition

Academic engagement is the extent to and way in which students are actively involved in their schooling or HE studies, and comprises cognitive, behavioural and emotional engagement (Skinner, 2009). Behavioural engagement in particular is closely associated with academic habits such as persistence, planning and task monitoring (Collie et al., 2017).

Evidence

The hypothesis is that students who are more engaged with their learning and education at school or college will be more likely to progress to HE. There does not appear to be robust evidence of this direct relationship; instead, the link is (not always straightforwardly) mediated by attainment. Mixed evidence has been found for the relation between academic engagement and attainment. A meta-analysis of 69 studies found an overall medium positive correlation of cognitive, behavioural and emotional engagement with attainment for school students, with the strongest correlation found for behavioural engagement (Lei et al., 2018). Interestingly, stronger correlations were found when teachers reported on their students' engagement than when students self-reported it. In a separate study, negative behavioural engagement was found to predict lower GPAs in university students; however, positive behavioural engagement was not found to predict higher GPAs (Collie et al., 2017). The authors suggest this may be because university students are likely to have good levels of positive behavioural engagement; therefore, it is the negative process of self-handicapping and disengagement that causes variance in attainment. It is difficult to establish a causal relationship between engagement and attainment as engagement is an outcome of a situational context rather than an individual characteristic (Gutman & Schoon, 2013).

Overall, there is scope for interventions to reduce negative engagement patterns, but it is worth combining the construct of behavioural engagement with other closely related factors such as motivation, self-regulation and study strategies, as engagement is likely to fluctuate and be influenced by contextual factors. Further, focusing solely on behavioural engagement may disregard the importance of the emotional aspect of the relationship between students and their school/HE institution in contributing to their engagement in learning.

Measures

Scale	Sample items	Comments
Student Engagement Instrument (schoolwork items) (Appleton et al., 2006)	What I'm learning in my classes will be important in my future. After finishing my schoolwork, I check it over to see if it's correct. When I do well in school it's because I work hard.	The SEI assesses school students' cognitive and affective engagement. It contains nine schoolwork items assessed on a 4-point scale of agreement. It has demonstrated strong validity and reliability in long-term, large-scale research when used in its entirety.
University Student Engagement Inventory (Maroco et al., 2016)	I pay attention in class. I am interested in the schoolwork. I talk to people outside the school on matters that I learned in class.	This scale contains 15 items measuring behavioural, cognitive and emotional engagement and was designed for university students in Portugal. Participants respond on a scale (1 = never to 5 = always). The authors report good reliability and validity (Sinval et al., 2021).

2.2   Goal orientation

Definition

Achievement goal theory proposes two types of belief around what motivates students to work towards a goal. Students with a learning-goal orientation are focused on gaining competence in an area, while those with a performance goal orientation are focused on demonstrating their competence to others and comparing their performance (Gutman & Schoon, 2013).

Evidence

A systematic review of outcomes associated with attainment once at university found small effect sizes for goal orientation, drawing on the results of 38 meta-analyses (Schneider & Preckel, 2017), despite specific interventions around goal orientation showing positive outcomes in terms of retention and completion (Hoyert et al., 2012). Goal orientation may therefore be relatively less important for academic success in HE than other outcomes such as self-efficacy. This premise is supported by studies showing that the relationship between a learning-goal orientation and higher attainment is mediated by academic self-efficacy (Honicke et al., 2020), as learning to gain competence may engender greater confidence in one's abilities than learning to demonstrate performance. Nevertheless, given the promising evidence of its malleability and the relative ease of promoting it, goal orientation could be a worthwhile focus of WP activities if based on well-evidenced interventions. There is, however, a lack of research into the direct relationship between goal orientation and HE progression.

Measures

Scale	Sample items	Comments
Patterns of Adaptive Learning Scale (PALS) – Goal Orientation Scales (Midgley et al., 2000)	An important reason why I do my work in class is because I want to get better at it. I want to do better than other students in my class. It's very important to me that I don't look stupid in my class.	The PALS scale examines the relation between the learning environment and students' motivation, affect and behaviour. Participants respond to 31 items on a 5-point scale from 'not at all true' to 'very true'. It has been demonstrated to be valid and reliable in samples of various ages, ethnicities and cultures and is strongly related to a variety of educational and psychological variables (Anderman et al., 2005).

2.3   Grit and resilience

Definition

Grit is defined as an individual's perseverance and passion for their long-term goals (Duckworth et al., 2007). It is distinguished from other aspects of perseverance by its long-term quality, as it is a personality trait (Gutman & Schoon, 2013). Those with high levels of grit will work persistently on accomplishing a single important goal over a long period despite failure, adversity, or even boredom.

Grit and resilience are often perceived as similar constructs; however, there are distinctions between the two. Resilience refers to positive adaptation despite the presence of risks such as poverty, parental mental illness, or abuse (Masten, 2011), whereas grit focuses on whether individuals continue to persist in the face of minor setbacks. Resilience is not necessarily a skill that can be improved, but a dynamic process.

Evidence

Grit has attracted attention among educational psychologists as a significant non-cognitive predictor of academic performance (Duckworth et al., 2007). The continuous and focused application of talent over time has been found to result in the accomplishment of difficult goals in areas including attainment, university graduation and labour market performance (Eskreis-Winter et al., 2014). Several studies by Duckworth and colleagues have shown that grit is even more important than talent in achieving ambitious career goals, and has the potential to be instilled in individuals at a relatively young age (Duckworth & Gross, 2014). Grit may, therefore, have the potential to improve school and HE completion and participation rates, as well as attainment (Light & Nencka, 2019).

A 2015 study with 116 US college students found that the students' perceived resilience was significantly associated with using more regulatory study strategies, which directly influenced attainment as measured by GPA (Johnson et al., 2015). This indicates that resilience does not necessarily lead to higher attainment, but is linked to better effort regulation, self-regulation and time management.

Resilience may also be important in the transition to university, as this can be a difficult period for students, with a UK study of first-year students finding that higher levels of resilience on entering university were associated with higher attainment at the end of Year 1 and lower dropout rates (Allan et al., 2014).

In the UK, Mendolia and Walker (2015) used a combination of questions from the Longitudinal Study of Young People in England (LSYPE) to construct a measure of grit that includes effort, a hardworking attitude and the ability to pursue long-term goals. The results suggested that a gritty personality is strongly associated with a lower probability of dropping out from education or the labour market aged 16. While not explicitly investigating HE progression, the evidence showing the converse (i.e. a negative relationship with drop out) is encouraging for the likely effectiveness of interventions that could raise HE progression by increasing grit and/or resilience.

Measures

Scale	Sample items	Comments
The Academic Buoyancy Scale (Martin & Marsh, 2008)	I'm good at dealing with setbacks at school (e.g. negative feedback on my work, poor results). I don't let study stress get on top of me. I think I'm good at dealing with schoolwork pressures. I don't let a bad mark affect my confidence.	This scale consists of four items focused on overcoming setbacks at school. Participants respond on a 7-point scale of agreement. The authors have reported good validity for the scale.

Scale	Sample items	Comments
The Child and Youth Resilience Measure (Renbarger et al., 2020)	I feel I belong at my school. I have role models (people I look up to). I know how to behave in different social situations.	The CYRM has been used frequently in global research. It includes 28 items relating to four categories of resilience: individual, relationships, community and culture. Participants respond on a 5-point scale (1 = 'not at all'; 5 = 'a lot'). Its validity has been researched in multiple studies and found mixed evidence, suggesting that resilience is difficult to compare across settings.
The Effort and Diligence Measure (Mendolia & Walker, 2015)	Doing well at school means a lot to me. At school, I work as hard as I can. Working hard at school now will help me to get on later in life.	This scale combines seven questions on schoolwork attitudes, perseverance and long-term objectives. The participants rate how much they agree with the statements on a 4-point scale ranging from 'strongly agree' to 'strongly disagree'. The scale does not appear to have been validated in further research.
The Grit Scale (Duckworth et al., 2009)	I often set a goal but later choose to pursue a different one. I finish whatever I begin. Setbacks don't discourage me.	The Grit Scale is an eight-item scale measuring levels of 'grittiness' in the form of perseverance and passion for long-term goals. Participants respond on a 5-point scale from 'not like me at all' to 'very much like me'. It has been validated for use with adults and young people from age 10.

2.4   Locus of control

Definition

Locus of control refers to individuals' attitudes towards their future success, and to what extent this depends on their skills and effort (internal locus) or chance, immutable structures and the actions of others (external locus) (Rotter, 1966). Locus of control is therefore similar to mindset and goal orientation in that it relates to future outcomes and how these are affected by the effort made by an individual. In an educational context, locus of control can also explain whether students view previous academic performance as resulting from their own, internal effort and ability, or from external causes such as poor teaching.

Evidence

Multiple studies have found a positive relationship between internal locus of control and higher attainment, but there is no substantial evidence of a direct link to HE progression. Curtis and Trice (2013) for example, found a statistically significant correlation between academic locus of control and GPA, absence and procrastination.

Rakes and colleagues (2013) found that students with an external locus of control were more likely to procrastinate regarding online coursework. Drago and colleagues (2018) also found a positive relationship between academic internal locus of control and GPA when controlling for gender, class size, family income and ethnicity.

A finding relevant to HE access and success is that female students with an internal academic locus of control and high levels of self-esteem reported easier adjustment to university than female students with an external locus of control and low self-esteem (Mooney et al., 1991). This suggests that locus of control contributes to adjustment to university and may, therefore, be worth addressing in access and success interventions.

A promising intervention study found that university students who completed an online intervention where they learned about the locus of control and mindsets, and applied these to their own experiences, had higher self-ratings of growth mindset and internal locus of control after the intervention (Nallapothula et al., 2020). These increases were also associated with higher self-efficacy and higher self-confidence.

Measures

Scale	Sample items	Comments
Career Locus of Control Scale (for adolescents) (Millar & Shevlin, 2007)	If I am to get the job I want, I will have to do well and try hard. Luck is the most important factor in determining whether I will get the job I want. It doesn't matter what career I want— what I will be is in the hands of other people, like teachers and employers.	The CLOC contains 47 internal and external locus of control items. Participants respond on a 6-point scale of agreement–disagreement. The validity of this scale has been shown in further research (Perry et al., 2011). While this scale assesses locus of control in relation to careers, it could be adapted for university progression.
Multidimensional Measure of Children's Perceptions of Control (cognitive domain items) (Connell, 1985)	If I want to do well in school, it's up to me to do it. If I have a bad teacher, I won't do well in school. When I do well in school, I usually can't figure out why.	The MMCPC includes 12 cognitive domain items measuring unknown, internal and external locus of control. Participants respond on a 4-point scale from 'not at all true' to 'very true'. It has a good factor structure and construct validity.
Tertiary Student Locus of Control Scale (Santokhie & Lipps, 2020)	I am confident in my abilities to gain the most from my school life. I will do my best in my field of study.	This is a 30-item scale comprising three dimensions (academic, personal, and relationships to others). Respondents use a 5-point Likert scale (strongly disagree to strongly agree). It has been validated with a Caribbean student population with English as both their first language and the language of instruction at university.

2.5   Mindsets

Definition

Mindset theory proposes two beliefs about the malleability of personal characteristics. Students who have a growth mindset believe that their qualities can be altered through effort and therefore put in more work to gain competence, while those with a fixed mindset believe their qualities are set in stone, are more focused on others' feedback and are less persistent in the face of setbacks (Dweck, 2006).

Evidence

Interventions suggest a positive relationship between a growth mindset and attainment in adolescents, with examples described in Gutman & Schoon's (2013) meta-analysis; however, there is a lack of research directly linking mindset to HE progression. Multiple studies in the 1990s showed that the increased effort and persistence associated with a mastery goal orientation lead to higher attainment (Elliot, 1996; Meece & Holt, 1993; Pokay & Blumenfeld, 1990). The causality of this relationship is demonstrated in intervention studies: for example, in a study by Good and colleagues (2003), students aged 12–13 were assigned an undergraduate student mentor who taught them either about the expandable nature of intelligence (growth mindset group) or about the difficulties of transitioning to secondary school or the dangers of drug use (control group). Students who were taught about a growth mindset had significantly higher reading scores at the end of the year than their peers in the control group, and female students who took part in the intervention also had higher maths scores.

It is worth noting that mindset theory has been criticised by researchers, as some studies have not found the association between mindset and attainment described above. However, the researchers who originated mindset theory have argued that mindsets and attainment are most strongly linked in students facing academic difficulties, which may explain low effect sizes. In mindset intervention studies that showed low impact, the authors have emphasised the influence of using unsuitable mindset measures and the absence of specific features that make mindset interventions effective (Yeager & Dweck, 2020).

Measures

Scale	Sample items	Comments
Implicit Theory of Intelligence Scale for Children (Blackwell et al., 2007)	You have a certain amount of intelligence, and you really can't do much to change it. You can always greatly change how intelligent you are. No matter how much intelligence you have, you can always change it quite a bit.	The ITIS includes three statements measuring a fixed mindset and three statements assessing a growth mindset. Respondents indicate their agreement on a 6-point Likert scale. This measure has demonstrated high internal reliability and validity. It is readily usable in a WP context but is limited by its focus on changing 'intelligence'.

2.6   Motivation

Definition

Academic motivation comprises students' investment in their learning and their desire to learn and master the learning material (Hazel et al., 2013). Motivation is often categorised as intrinsic, extrinsic or amotivation (Vallerand et al., 1992). Intrinsic motivation refers to doing an activity for itself, for example going to school because it is interesting and enjoyable. Extrinsic motivation refers to behaviours seen as a means to an end, for example studying for an exam because a good grade will trigger a material reward from parents. Amotivation refers to a state in which individuals no longer see any connection between their actions and academic outcomes, for example not knowing why they attend school at all because it is 'pointless'.

When thinking about motivation, it is important to consider an individual's background and context. Identity-based motivation theory proposes that people are motivated to make sense of their experiences and act in ways that fit their personal and social identities. Identities are, therefore, dynamically constructed in different contexts and people act in ways congruent with these identities. This relationship between actions and identity works both ways: if an action is difficult, people (mis)interpret difficulties and deduce that the associated identity is impossible to achieve and that acting in line with identity is irrelevant (Oyserman, 2015).

Evidence

Research indicates that intrinsic motivation, extrinsic motivation and amotivation are significantly related to attainment. A study with first-generation high school and college students in the US found that higher levels of extrinsic motivation and amotivation were associated with lower grades, while higher intrinsic motivation was associated with higher grades and higher course retention (Próspero et al., 2012). However, it is difficult to raise intrinsic motivation globally for future outcomes as it is highly related to contextual elements such as teaching methods and classroom environment. Interventions aiming to raise intrinsic motivation would, therefore, be required to increase interest in a particular subject or goal (Hidi & Harackiewicz, 2000). While the link between motivation, attainment and pursuing HE is well-documented in the research literature, it is worth noting that this relationship is usually highly interrelated with self-efficacy and social contextual factors.

Identity-based motivation theory may be more useful to the field of HE access and success, as it accounts for the influence of identity on behaviour and motivation to complete tasks. In an intervention aimed at students aged 13–14, the students' identity-based motivation was raised by teachers in the classroom by helping them to generate connections between school and their future, teaching them to value obstacles along the way and developing strategies to overcome these (Oyserman et al., 2017). Crucially, raising motivation in this way significantly improved attainment in the same year and after a two-year follow-up (Oyserman et al., 2006). This suggests that the link between increasing motivation and university access could be mediated by attainment.

The approach taken to increase identity-based motivation in this study reflects the difficulties often faced by young people who do not see themselves as possible future university students

and face obstacles in progressing to HE. Similar to interventions designed to improve sense of belonging, resilience and adaptability, this study found that normalising challenges and teaching ways to overcome them had positive effects on attainment and may be a valuable approach in WP

activities to raise the motivation of young people to progress to university. This should not be taken to mean that motivation to progress to HE is synonymous with aspiration to progress, which we cover in Section 4.1 below.

Measures

Scale	Sample items	Comments
MSLQ Intrinsic/Extrinsic Motivation subscale (Pintrich et al., 1991)	It is important for me to learn the course material in this class. When I take tests, I think about the consequences of failing. If I don't understand the course material, it is because I didn't try hard enough.	The MSLQ is a self-report instrument designed to assess university students' motivation and study strategies for a US college course. Participants rate statements on a 7-point Likert scale from 'not at all true of me' to 'very true of me'. It has a good factor structure and predictive validity.
Identity-based Motivation Measure (Oyserman et al., 2021)	If working on a task feels very difficult, that type of task may not be possible for me. If a task is difficult, it is probably important for me to do well at it. Tasks that feel difficult are important tasks.	This scale measures whether students perceive difficulty as importance or difficulty as impossibility. It does not seem to have been validated in further research.
The Academic Motivation Scale (Vallerand et al., 1992)	Because I enjoy learning new things. To get a more prestigious job in the future. Because I don't want to disappoint my family.	The AMS measures first-year university students' motivations for going to university, including extrinsic and intrinsic motivation and amotivation. Students' motivations reflect their perception of HE. The scale has been validated (Grouzet et al., 2006).

3.   SELF-PERCEPTIONS

3.1   Self-concept

Definition

Self-concept is defined as a person's perception of themselves as formed through experiences in their environment (Shavelson et al., 1976). The enhancement of self-concept is seen as a central goal of education and an important vehicle for addressing the social inequities experienced by disadvantaged groups (Marsh & Craven, 2006). Having high academic self-concept means perceiving oneself as academically competent, and this perception is formed through the student's experience and interpretation of the school environment (Craven & Marsh, 1997).

Evidence

In terms of attainment, the strongest correlations have been found between academic self-concept and attainment, rather than general self-concept (Möller et al., 2020). It is therefore important to address academic self-concept specifically, as general self-concept has not been found to have a strong correlation with attainment at university (Robbins et al., 2004). The relationship between academic self-concept and attainment is likely mediated by motivation: in an analysis by Marsh and Martin (2011), high school students with higher self-concept (who perceived themselves as academically competent) obtained higher grades because their higher self-concept led them to be more autonomously motivated at school. A meta-analysis of intervention studies with young people aged 3–18 concluded that self-concept can be improved and that interventions are particularly effective when they target a specific

dimension of self-concept (O'Mara et al., 2006). In the context of WP, this could mean targeting academic self-concept in a specific study intervention or discipline.

Measures

Scale	Sample items	Comments
Academic Self-Concept Scale (Reynolds, 1988)	I consider myself a very good student. I often expect to do poorly in exams. I usually get the grades I deserve in my courses.	The ASCS consists of 40 items on a 4-point scale of agreement and measures 'an academic facet of general self-concept'. The author has reported good reliability and validity of the scale when used with US college students. Permission must be sought from the author to use the scale.
Personal and Academic Self-Concept Inventory (maths and verbal ability items) (Fleming & Whalen, 1990)	Do you often think of yourself as an outstanding student? Do you think of yourself as someone who can do quite well in exams and assignments in most of your classes? Are you frequently concerned about your ability to do well in school?	The PASCI consists of 45 items measuring self-concept and social anxiety. Participants respond on a 9-point scale (1 = practically never; 9 = very often). The authors report good validity and reliability for the scale as a whole.
Self-Description Questionnaire (academic items) (Ellis et al., 2002)	I get bad marks in most school subjects. Work in English classes is easy for me. I get good marks in mathematics.	The short version of the SDQ contains 11 items relating to academic self-concept (maths, English, and school subjects). Participants rate their responses on a 6-point scale (1 = false; 6 = true). The SDQ scale in its entirety has been validated for use with adolescents.

3.2 Self-efficacy and confidence

Definition

Self-efficacy is the belief in one's ability to plan and execute the skills necessary to produce a certain behaviour (Bandura, 1979). The terminology of confidence is often found within the language used in WP work, used in a similar sense to self-efficacy. However, self-efficacy is a more specific construct as it is always defined in relation to a task, goal, or domain.

Evidence

In three systematic reviews, encompassing 38 meta-analyses and over 7,000 studies, academic self-efficacy consistently emerges as the strongest correlate of attainment in HE (Richardson et al., 2012; Robbins et al, 2004; Schneider & Preckel, 2017). Part of the correlation between self-efficacy and attainment can be attributed to the fact that prior attainment affects both self-efficacy and future attainment. Self-efficacy is also influenced by external factors that are difficult to influence in the context of a WP intervention, such as engagement with school/university, progress towards goals, and outcome expectations.

When a distinction is made between performance self-efficacy and academic self-efficacy, performance self-efficacy has a stronger association with attainment, presumably because it is easier for students to report their confidence regarding a concrete task than for academia more generally (Schneider & Preckel, 2017). When measuring self-efficacy, it may therefore be important to refer to a specific academic task.

Raising academic self-efficacy can be achieved in WP activities through working with successful peers, supporting students to accomplish difficult tasks, providing encouragement, guidance and positive feedback (for example through mentoring), and encouraging feelings of excitement and positivity rather than stress (Atanasov et al., 2013).

Academic self-concept and academic self-efficacy are both self-constructs and thus share similarities. The main distinction is that self-efficacy is based on the self-evaluation of a person's past performance, and self-concept is based on self-evaluation in relation to others. In Choi's (2005) study with US college students, both academic self-concept and specific self-efficacy were significant predictors of term grades, and each other. Similarly, a meta-analysis found no systematic difference in the extent to which academic self-concept and academic self-efficacy measures could predict improvements in attainment in longitudinal studies (Valentine et al., 2004). WP interventions could therefore focus on either one of the two constructs but should ensure the logic of the intervention is clear, the construct is specified and a construct-specific measure is used in any evaluation work.

The construct of university self-efficacy, which we define as the level of confidence in one's abilities to develop the knowledge, skills and behaviours needed to succeed at university, is also relevant to WP. At a university level, students with higher self-efficacy for university are more likely to be academically successful and less likely to drop out. Wright et al. (2013) found that higher university self-efficacy was associated with a significantly higher likelihood of persisting and of being academically successful, even after controlling for other relevant variables. From a randomised controlled trial study commissioned by The Brilliant Club, we know that university self-efficacy can be improved through intervention (Bellaera, 2020).

Measures

Scale	Sample items	Comments
Academic Behavioural Confidence Scale (Sander & Sanders, 2009)	Study effectively on your own in independent/private study. Respond to questions asked by a lecturer in front of a full lecture theatre. Attain good grades in your work.	The ABC scale assesses the confidence that university students have in their ability to engage in the study behaviours that may be required during their academic career. It contains 16 items, rated on a 5-point scale from 'not at all confident' to 'very confident'. The authors report good validity and reliability.
Core Districts Social-Emotional Learning Survey (self-efficacy items) (West et al., 2018)	I can earn an A in my class. I can do well in my tests, even when they're difficult. I can meet all the learning goals my teachers set.	The Social-Emotional Learning Survey was developed for 8–18-year-olds and contains eight items measuring self-efficacy. Participants respond to four items on a 5-point scale from 'not at all true' to 'completely true', and to another four items on a 5-point scale from 'not at all confident' to 'completely confident'. The items in this survey were adapted from previous research studies and have not been validated as this scale.
MSLQ Self-Efficacy for Learning and Performance subscale (Pintrich et al., 1991)	I'm confident I can do an excellent job in the assignments and tests in this course. I expect to do well in this class. I'm certain I can master the skills being taught in this class.	The MSLQ is a self-report instrument designed to assess university students' motivation and study strategies for a college course. Participants rate statements on a 7-point Likert scale from 'not at all true of me' to 'very true of me'. It has good factor structure and predictive validity (Pintrich et al., 1993).

Scale	Sample items	Comments
Students' Approaches to Learning (Marsh et al., 2006)	I study to get a good job. When I study, I try to understand the material better by relating it to things I already know. I'm good at most school subjects.	The SAL was developed by the OECD to measure 14 factors related to approaches to learning. It contains 52 items, half of which are assessed on a 4-point response scale from 'almost never' to 'almost always' and half of which are assessed on a 4-point scale from 'disagree' to 'agree'. It has been validated for use with approximately 4,000 15-year-olds from each of 25 countries. This scale also contains items that relate more closely to the study strategy items listed in Section 1.4.
The Readiness and Expectations Questionnaire (Jansen & van der Meer, 2012)	I am good at working independently. I am confident writing essays. I am confident collecting and selecting information for assignments/projects.	The REQ was designed to measure students' preparedness for university in terms of their study skills. It contains 21 items, rated on a 5-point scale of agreement. The scale has not been empirically validated.

4. SOCIAL OUTCOMES

4.1 Higher Education aspirations and expectations

Definition
Aspirations encompass all that children and young people hope to achieve for themselves in the future, while expectations add a dimension of achievability – whether young people believe they can achieve them and will be allowed to (Harrison & Waller, 2018).

Evidence
It has historically been assumed that disadvantaged young people are less likely to progress to HE because they have lower aspirations than their more advantaged peers; therefore, their aspirations should be raised. However, empirical studies have found that young people's aspirations for HE and future careers are high regardless of their background: the vast majority of students, including those from highly disadvantaged backgrounds, aspire to gain further academic qualifications (Baker et al., 2014). Young people from lower socioeconomic groups have aspiration levels far higher than their expectations of progressing to HE (Boxer et al., 2011) or their actual HE participation rates (Croll & Attwood, 2013).

Expectations may therefore be more important than aspirations, as young people may have the desire to progress to HE but not believe that this is possible for them. The Education Endowment Foundation suggests it is more helpful to ensure that young people have the knowledge, skills and resources to progress towards and realise their aspirations than to raise aspirations (EEF, 2021). One study found that young people's expectations of university often fail to align with their experience of it and that this can lead to lower retention; it is therefore important that young people are given the knowledge to understand what university entails (Lowis & Castley, 2008). Simultaneously, it is important to note that HE expectations are influenced by a complex set of factors, including family, community and understanding of/beliefs about the structural constraints of the education system (Hodkison & Sparkes, 1997).

Measures

Scale	Sample items	Comments
Students' Intentions Towards University (Vardy et al., 2020)	I see university as part of my future. Once I have finished compulsory schooling, I would rather get a full-time job than go to university. My teachers encourage me to aim for university.	The SITU was developed to evaluate HE access interventions by measuring students' intentions towards university. Participants respond to 15 items on a 4-point scale of agreement. The authors report good reliability and validity in pilot testing.
The Brilliant Club university evaluation items	I can complete an extended piece of written work to a high standard. I understand why and how people study when they are at university. I know a lot about what it is like to be a student at university. I have a good understanding of what a highly selective university is. I know a lot about the differences between learning at school and learning at university. I know the steps I need to take to go to university in the future. I am confident that I can get the grades required to progress to a highly selective university.	These items are used to measure university self-efficacy and university knowledge in internal evaluations at The Brilliant Club, spanning several of the outcomes discussed in this review. Participants respond on a 5-point scale of agreement. They are included here together for ease of reference.
University expectations and experience questionnaires (Lowis & Castley, 2008)	will have contact with my tutors / I have had contact with my tutors. I will work in collaboration with other students, and share experiences with them / I have worked in collaboration with other students, and shared experiences with them. I will become involved in a variety of learning activities and not just sit listening to lectures / I have become involved in a variety of learning activities and did not just sit listening to lectures.	These scales are a measure of students' early expectations of HE, matched subsequently with their actual experiences. Participants respond to seven items on a 4-point scale from 'very often' to 'rarely/never' in their university induction week and at the end of their first term. The instrument has been tested in a pilot study but not validated in further research.

4.2   Sense of belonging

Definition

A sense of belonging in HE can be defined as the extent to which a student feels connected to the HE environment, peers, faculty and others in college and is involved in 'campus' activities (Lotkwoski et al., 2004). It can be seen both as a concurrent measure (when students are in HE) or a prospective measure, looking at how students in schools/colleges would deem that they belong were they to progress to HE.

Evidence

The evidence suggests that university students with a higher sense of belonging are more likely to persist with their studies (Hausmann et al., 2007) and have higher academic achievement (Walton & Cohen, 2007). This is particularly important for students from underrepresented backgrounds, who have been shown to respond well to belonging-related interventions. For example, in one US study, Black students took part in a brief social-belonging intervention at university that presented social and academic difficulties early in college as being common and temporary (Brady et al., 2020). The participants' grades and well-being improved from their 2nd year to their 4th year, halving the racial attainment gap. A 7-year follow-up also found positive effects on career success.

However, there is an inherent difficulty in promoting a sense of belonging in HE among students still at school. This is reflected in a relative paucity of research examining a sense of belonging in HE prior to HE study. Work by Uni Connect is one exception, and its evaluation includes a scale for the prospective measure of a sense of belonging in HE. Interim findings from March 2021 show mixed results for the impact of

Uni Connect's work on this measure, as the overall proportion of students who agreed that university is for them decreased slightly and there was no change in whether students thought they would fit in well with others in HE (CFE Research, 2021). The authors note the possibility that learning more about HE can make students feel less sure that they belong there if, as a result, they perceive a greater mismatch between their social identity and the identities valued in HE. They recommend that interventions are sustained and tailored towards groups with lower feelings of belonging, to address the specific issues they face.

Research into adaptability may be useful when trying to increase a prospective sense of belonging, as it can be promoted among school students and has been associated with positive behavioural engagement at university and higher attainment (Collie et al., 2017). Adaptability interventions could use a similar approach to resilience interventions to show school students that uncertainty is normal and demonstrate how they can adjust their cognition and behaviour when faced with uncertainty. Measuring and raising the adaptability of students before they enter university may be a useful way to prepare students to cope with the difficulties of starting a university course but, again, the evidence base is relatively limited.

Attitudes and beliefs about being able to succeed and fit in at university are important in preparing students for the transition to HE and for progression itself (Moore et al., 2013). HE access interventions with school students may therefore benefit from instilling in students the belief that university is 'for them' and that they will belong there if they do wish to attend, by preparing students for the academic and personal challenges of university life.

Measures

Scale	Sample items	Comments
King's College London sense of belonging measure: The Big 6 (Nwosu et al., 2021)	I made the right decision in choosing to study at King's. I feel optimistic about the year ahead. I feel confident that I can cope with my studies. I fit in at King's. I feel supported by King's. I participate in student life beyond my academic commitments.	These six items were developed by KCL to measure the sense of belonging in second and third-year students. Students are asked to respond to the items on a 5-point scale of agreement. The scale has not been validated but would be well-suited for use in universities.
The Social Integration and Persistence Intentions Scale (Pascarella & Terenzini, 1980)	Most students at this university have values and attitudes different from my own. Most of the faculty I have had contact with are interested in helping students grow in more than just academic areas. I am confident that I made the right decision in choosing to attend this university.	This survey includes five scales of 30 items in total, designed for use with university students: Peer-Group Interactions; Interactions with Faculty; Faculty Concern for Student Development and Teaching; Academic and Intellectual Development; and Institutional and Goal Commitments. Participants respond on a 5-point scale of agreement. The scale has been validated by the authors.
Uni Connect (formerly NCOP) Perceptions of HE (CFE Research, 2021)	University is for people like me. I have the academic ability to succeed at university. I could cope with the level of study required at university. I would fit in well with others at university.	This survey includes four items chosen from a measure designed by CFE Research for the Uni Connect evaluation, which was developed in collaboration with stakeholders using items from previously validated surveys where possible. The items assess perceptions of HE related to social identity and academic ability in students aged 13–18. Participants respond with 'agree', 'neutral', 'disagree' or 'don't know'.

4.3 Social and cultural capital

Definition

Social capital refers to the social networks and connections that can provide access to social goods, such as educational benefits and status. Cultural capital refers to knowledge present in the home environment, in the form of behaviour, dispositions and knowledge, which are internalised through socialisation processes and investment in education and training (Bourdieu, 1986).

Evidence

Research has shown that students who lack access to the social and cultural capital valued by the dominant social classes are limited in their educational outcomes (Mountford-Zimdars et al., 2015; Reay et al., 2010). WP practices have focused on building social and cultural capital in students from underrepresented backgrounds, to enable the kind of transition to university experienced by the dominant social classes (Hannon et al., 2017). However, this approach implies that the social and cultural capital of students from underrepresented backgrounds lacks legitimacy and value; it presents the issue of HE progression as a deficit lying with the individual, failing to acknowledge the role of structural inequalities.

SUMMARY

This review has outlined a wide range of intermediate outcomes that are relevant to HE access and success. Where the evidence base for a direct relationship with these long-term intended outcomes is not strong, we have focused on their relationship with attainment, as the strongest predictor of HE access in the UK context (Crawford et al., 2016).

The review has highlighted that all the intermediate outcomes reviewed are accompanied by measurement scales that are either:

- already fully validated and appropriate for use with a learner population in the UK, or

- require some adaptation and re-testing before they are ready for use in the context of the evaluation of access and student success activities.

From the rapid review above, the most promising outcomes (those where the evidence base is strong, the measurement scales robustly developed and the intermediate outcomes amenable to change by WP interventions) are:

- Self-efficacy (academic and university).

- Metacognition and critical thinking.

- Study strategies.

- Sense of belonging (before and at university).

However, few scales have been designed (and validated) with learners of all ages likely to take part in access and success interventions. In the next phase of this research project, therefore, scales for the outcomes listed above have been constructed and validated with school and university students. The validation process ensures that the scales measure consistently the outcomes they intend to measure and that they relate to attainment and HE progression. The scales are now available on the TASO website, where more information can be found about their development and use.

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