Teachers' written feedback in English: How does this relate to the pathways leading to self-regulated learning in 11-13 year old students

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Abstract

Self-regulated learning (SRL), which includes cognitive, metacognitive, behavioural, motivational and affective facets of learning, is widely associated with better educational outcomes. The purpose of this study, therefore, is to gain understanding into the nature of teachers' written feedback given to 11-13 year-old students on pieces of extended writing in the subject of English, with particular focus on what proportion of feedback relates to SRL and how this feedback is associated with both students' and teachers' perceptions of their SRL abilities.

This quantitative study collected data from a convenience sample of four English teachers and 75 students (Years 7 and 8) attendant at a high socio-economic, boys-only, independent preparatory (8-13 years) school in England. A total of 2388 naturally-occurring teacher feedback comments were collected from student English exercise books, on 283 pieces of work completed prior to the study. The thematic content of individual, separate utterances of feedback comments was coded according to an adapted version of Hattie and Timperley's (2007) four-level feedback model, incorporating aspects of Clark's (2012) formative assessment model. This allowed for analysis of planning, monitoring and reflecting (metacognitive) and ambition, effort and persistence (self-efficacy) pathways from feedback about SRL, in addition to more general examination of feedback about the task, the processing of the task and the self as a person. Students' perceptions of their SRL capabilities were measured using the widely-employed self-report Motivated Strategies for Learning questionnaire (MSLQ) (Pintrich at el., 1991). A survey instrument was designed to capture teachers' perceptions of students' metacognitive self-regulation and self-efficacy, relative to other students they have taught previously, in similar contexts.

Most feedback was found to be about the task. Teachers gave high proportions of feedback about SRL (between one fifth and one quarter). Most comments related to SRL were linked to metacognitive pathways to SRL, rather than self-efficacy pathways. There were, however, notable differences between the two teachers in the contribution of individual

monitoring, reflecting, ambition and effort pathways. Findings suggest that the metacognitive and self-efficacy constructs are not as clearly defined as the framework implies.

Students reported medium or high levels of the SRL skills measured. Relationships were found between the types of feedback given and both students' perceptions of their own SRL abilities and teachers' perceptions of the students' SRL abilities. Results suggest that teachers have a more accurate awareness of students' self-efficacy than their metacognitive self-regulation, despite providing more feedback associated with the latter; indeed, when rating students, teachers were shown to poorly differentiate between these constructs.

Feedback was shown to be more closely associated with teachers' perceptions of student SRL ability, than students' own reflections, therefore more time could valuably be spent by teachers learning about their students' characteristics, especially their aptitude for SRL, in order to provide a greater proportion of SRL-related feedback, that is constructively aligned with promoting individual students' SRL.

Whilst there are important limitations to this study, including the small sample of teachers, highly standardised population and difficulties in categorising some feedback comments, it recommends that both the findings and feedback model are employed by teachers, school management and training providers. This would help to understand how feedback can be more effectively tailored to optimise pathways towards improved individual students' SRL and how teacher professional knowledge might be developed to facilitate this.

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1. Introduction

1.1 Overview

> Those who want to determine what works in education are doomed to fail, because in education, "What works?" is rarely the right question, for the simple reason that in education, just about everything works somewhere, and nothing works everywhere. (Wiliam, 2016, p. 63)

The white paper, *Educational Excellence Everywhere* (Department for Education, 2016), promotes an evidence-based approach to improving students' experience of education, including advocating for initial teacher training programmes and qualified teacher status accreditation to require teachers to receive the most up-to-date research on pedagogy and student learning (p. 12-13). Meta-analysis consequently published by the Education Endowment Foundation as part of their systematically-updated *Teaching and Learning Toolkit* reports feedback as being a low-cost strategy which has a very high effect size of +6 months, i.e. learning gains equivalent to more than 6 months (Education Endowment Foundation, 2021a). Whilst this white paper recognises that there is "rarely one standardised solution that will work in every classroom for government to impose" (Department for Education, 2016, p. 9), it is argued that reducing the impact of feedback to an effect size in this manner does not encourage teachers to account for the complex nature of feedback in its different forms, nor the unique, non-standardised nature of students and their learning progressions. "What works?" in terms of feedback will not be the same in every school, classroom, or subject, for every student.

Based on an experimental study to examine the effects of using a feedback request form with university students in the Netherlands, Agricola et al. (2020) conclude that students receiving verbal feedback perceived it to be of higher quality and more useful than students receiving written feedback. However, in the secondary education classroom it may not be possible to provide the desired level of feedback verbally, due to time availability or class size. Although the impact of teacher written feedback is shown to be marginally less effective (+ 5

months effect size) compared to verbal feedback (+7 months effect size) (Education Endowment Foundation, 2021a), it remains an effective and dominant aspect of teaching and learning practices in schools. However, with extensive demands on teachers' workloads, careful consideration should instead be given to targeting the focus and intention of feedback for individual students, or groups of students, rather than teachers just increasing the quantity of feedback given. In this regard, the Assessment Reform Group in the UK impress upon the sector the need for teachers to attend more time to gathering information about how their students learn and adapting their teaching and feedback approaches accordingly (Broadfoot et al., 1999). However, research (e.g. Dignath-van Ewijk & Van der Werf, 2012) suggests that such knowledge, needed to implement the desired level of feedback practice and move towards a "new paradigm of feedback" (Carless, 2015), is still lacking among teachers. Alternatively, the knowledge deficit may lie at the door of educational research, as Dann (2017) argues that "feedback has not been sufficiently understood, developed or applied for the role it could and should play in a school system that seeks new futures" (p. 31).

Formative assessment, often used synonymously with Assessment *for* Learning, describes the classroom-based assessment practices that, themselves, have positive effects on learning. Borne out of work by Natriello (1987), Crooks (1988) and spring-boarded into general awareness by Black and Wiliam's (1998) review, formative assessment encapsulates a diverse range of processes and learning activities (e.g. Ramprasad, 1983; Wiliam & Thompson, 2007). Important to the current study, Black and Wiliam (2006) argue that within the concept of formative assessment, the "quality of interactive feedback is a critical feature in determining the quality of learning activity" (p. 100). However, Perrenoud (1998) counters this, proposing that it is "more important to concentrate on the theoretical models of learning and its regulation, and their implementation. These constitute the real systems of thought and action, in which feedback is only one element" (p. 86).

Self-regulated learning (SRL) is the process by which students engage their cognition, metacognition, behaviours, motivation and emotions towards the achievement of desired learning goals (Schunk & Green, 2018). SRL is widely regarded as essential for students' academic success, to develop a future life-long love of learning, and a vital competency required by employers in this increasingly knowledge-based society; it is, therefore, an important area for research and a key educational objective for schools. This is never more the case than following the Covid-19 pandemic, with the shift for most students to remote, or hybrid learning, anecdotally putting increased demands on their abilities to self-regulate their learning strategies and behaviours. However, only a low proportion (approximately 40%) of teachers report using pedagogical approaches designed to promote SRL (OECD, 2019), despite the strongly evidenced effect size on learning gains (+ 7 months) for strategies aligned with student metacognition and SRL (Education Endowment Foundation, 2021b).

Brandmo et al. (2020) note that there is relatively little research that is grounded in both SRL and formative assessment literature, explaining that examination into the relationships between these fields offers potentially lucrative insights into how teachers can tailor their practices to further student learning. Opportunities for teachers and students to collaborate to enhance students' SRL through formative assessment need to be explored further, beyond just the theoretical, and into the practical. For example, Perry et al. (2020) conclude that, with primary education students, classroom environments with greater embedded formative assessment practices or interventions designed to support SRL were related to students' improved self-assessment, scores on motivation and SRL measures, and learning outcomes. It would be of great interest to establish whether similar opportunities to support students' SRL can be developed through teachers' written feedback practices; this study aims to contribute to the limited body of literature in this area. It seeks to understand the effectiveness of a theoretical framework to analyse the nature of teacher feedback and how this might be employed, in conjunction with teachers' own beliefs and knowledge about students' perceptions

of their SRL skills, to better tailor feedback practices that actively promote SRL, i.e. to explore "what works?" for individual students. Specifically, this study intends to address a previously identified gap in the literature (Labuhn et al., 2010), namely whether students with different levels of SRL ability receive different proportions of feedback types.

It can reasonably be expected that in different contexts, including country, educational setting, student age and academic subject, teachers provide feedback differently. In particular, as Harris et al. (2015) recognise, research findings from higher education are unlikely to reliably generalise to secondary education settings, where students are younger, potentially less cognitively- and metacognitively-developed, and have less subject-based expertise. Therefore, this study intends to add to the literature by investigating how teachers provide written feedback in the core academic subject of English, in the early secondary, UK educational context.

1.2 Self-regulated learning

Models of self-regulated learning (SRL) aim to conceptualise the interplay between cognitive, metacognitive, motivational and emotional aspects of student learning required for the attainment of learning goals. A considerable variety of models exist within the literature, however, reflecting a range of underpinning traditions and foci (e.g. Boekaerts, 1996; Efklides, 2011; Pintrich, 2000; Winne & Hadwin, 1998; Zimmerman, 1989, 2000). A comprehensive discussion of these models is beyond the scope of this chapter; for a more detailed account, please see Panadero's (2017) review.

Among the most cited is Zimmerman's (2000) cyclical phases of SRL model, incorporating: (1) *forethought* (analysing the task, setting goals, planning, and activating motivational and learning strategies); (2) *performance* (executing the task, monitoring progress and engaging self-control of learning and behaviour); and (3) *self-reflection* (assessing task performance in relation to goals). Multiple instruments and measures have been developed referencing Zimmerman's (2000) model, including the Self-Regulated Learning Interview

Schedule (SRLIS) (Zimmerman & Martinez-Pons, 1986) and the Academic Self-Regulation Scale (A-SRL) (Magno, 2010). Despite this, the current study employs the Motivated Strategies for Learning questionnaire (MSLQ) (Pintrich et al., 1991, 1993), reported to be the most used instrument in SRL measurement (Roth et al., 2015). Whilst a number of studies have commented on psychometric problems with the MSLQ (such as the factor structure (e.g. Hilpert et al., 2013) and the internal consistency estimates (e.g. Holland et al., 2018)), its use has been increasingly adapted and successfully validated for other educational settings and population demographics (e.g. Chakraborty et al., 2021; Jackson, 2018; Soemantri et al., 2018) and has the added strength of combining SRL and motivation (Panadero, 2017). Pintrich's (2000) model of SRL, to which the MSLQ relates, comprises four phases: (1) forethought, planning and activation; (2) monitoring; (3) control; and (4) reaction and reflection. Each of these four phases then has different areas for student regulation: cognition; motivation; behaviour; and context.

Irrespective of the lens through which SRL is viewed, meta-analyses (e.g. Dignath et al., 2008) demonstrate SRL to have a positive effect on student achievement. However, it may not be as straightforward as promoting the use of SRL interventions in the classroom to achieve such learning gains. Kramarski (2018) concludes that teachers, taking a dual role, must both use SRL themselves and also teach SRL knowledge, skills, and dispositions to students, termed self-regulated teaching. To do so effectively, teachers need to have highly-developed knowledge of their students' SRL abilities. Therefore this study, uniquely within the related literature, also utilises a designed survey measure to capture teacher perceptions of students' SRL capabilities, to explore how these might influence the feedback provided.

1.3 Teacher feedback

There are many definitions of feedback within the literature, the majority of which, critically, go beyond simply identifying it as information provided by an agent, such as a teacher, to a student about their performance or understanding (Hattie & Timperley, 2007). Sadler

(1989) defines feedback as requiring information specific to the task or learning processes to be provided that seeks to address an identified gap between what the student understands and what is aimed for them to understand. Dann (2017) discusses three alternative conceptualisations of such a learning gap: firstly, a "deterministic approach" (the gap is predominantly determined by comparison to national or international standards); secondly, a "relational approach" (the gap, or "space", is viewed through the lens of Vygotsky's (1978) notion of the Zone of Proximal Development, as an interaction between teaching and learning, or teacher and student, which extends beyond existing learning); and thirdly, an "individualistic approach" (the gap is explored with students' individual understanding of their learning and internal processes at the forefront). Importantly, this study takes the latter individualistic view of a learning gap and, as Dann (2017) contends, the consequence is that how a student interprets feedback is inherently intertwined with their self-regulatory practices. With SRL in mind then, Winne and Butler's (1994) definition, that "feedback is information with which a learner can confirm, add to, overwrite, tune or restructure information in memory, whether that information is domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, or cognitive tactics and strategies" (p. 5740), is closely-aligned to the context of this study, i.e. feedback can be directed in numerous ways, including towards SRL, which can relate to metacognitive and/or self-efficacy aspects.

Natriello (1987) captures "providing feedback to student performance" (p. 160) as one of his eight phases of teachers' work on assessment, the majority of which would now be considered formative assessment practices. Whilst this research focuses on asynchronous teacher feedback written on pieces of students' extended writing, it defines such feedback as an example of formative feedback, as it is intended to modify a student's cognition and/or behaviour in order to improve learning and performance (Shute, 2008) and address the learning gap (Black & Wiliam, 1998).

Recognised as an important area for research, numerous notable studies and reviews focus on feedback, including within the context of SRL and those attempting to summarise the properties of effective feedback (e.g. Bangert-Drowns et al., 1991; Bose & Rengel, 2009; Butler & Winne, 1995; Carless et al., 2011; Kluger & DeNisi, 1996; Kulhavy & Stock, 1989; Nicol & Macfarlane-Dick, 2006; Sadler, 1989; Shute, 2008). Whilst Hattie's (2009) high-profile meta-analysis reports a high effect size (*d* = .73) for feedback (one of the highest for contributions from teaching approaches, resulting in considerable attention within educational policy and practice), Black and Wiliam (1998) warn against giving too much credence to reported effect sizes. This caution reflects the highly-variable landscape of the field of feedback literature, which includes studies reporting feedback as having no effect (Bangert-Drowns et al., 1991) or even negative effects; for example, Kluger and DeNisi (1996) report an effect size of *d* = .38, with approximately one third of the effects being negative. Importantly for this study, Narciss and Huth (2004) assert that effective feedback requires not only consideration of the learning context, but also characteristics of the student, including, but not limited to, their metacognitive skills and self-efficacy.

Resulting from their renowned systematic review, Hattie and Timperley (2007) suggest that effective feedback should incorporate not just *feedback*, but aspects of *feedup* (i.e. related to learning goals) and *feedforward* (i.e. related to next steps) too; the scope of the current study, however, is limited to only *feedback*. Hattie and Timperley (2007) propose four major levels of feedback, within a model which seeks to encapsulate the differential effectiveness of feedback, given its focus and circumstances of use, in order to improve feedback practices in the classroom. Their model defines these levels as follows: "Feedback about the task" is related to how well a task has been performed, including whether a student's work is correct or how to acquire more or different information; "Feedback about the processing of the task" relates more specifically to the cognitive processes or strategies needed to complete a task successfully or construct meaning; "Feedback about self-regulation" may tend to focus a student's attention to

their metacognitive self-regulatory proficiencies and aspects of self-efficacy, aiming to initiate internal feedback, such that they are encouraged and supported with strategies to better self-assess, maintain engagement and reach targets set; and "Feedback about the self as a person" refers to more personal feedback that carries little information about the task. In summary, Hattie and Timperley (2007) suggest that feedback about the self as a person is the least effective, though commonly observed, and feedback about the processing of a task and about self-regulation are most powerful with regard to achieving deep, sustained learning gains. This study chose to utilise Hattie and Timperley's (2007) model within analysis of the nature of teacher feedback over others (e.g. Nicol & Macfarlane-Dick, 2006; Narciss & Huth, 2004) as it emphasises the broader motivation or focus of comments given, rather than the specific linguistic style or content, as well as explicitly referencing self-regulation. It is this "feedback about SRL" which is of particular interest to this study.

Of course, whilst the combination of national policy and research into feedback models and good feedback practices may tend to encourage feedback towards a standardised approach, without specific awareness of such literature or training in its use, the nature of feedback given by a teacher likely remains dependent on their ultimate perspective and belief of what education is for, as their feedback will be directed towards these ends.

1.4 Teacher feedback and pathways to SRL

Feedback is frequently cited as a "catalyst" to SRL (e.g. Butler & Winne, 1995, p. 246) and a number of published SRL models, both novel and more traditional, seek to explicitly situate external teacher feedback into their model (e.g. Chen & Bonner, 2019; Winne, 1996; Winne & Hadwin, 1998). The present study, however, holds at its core Zimmerman's definition of SRL, in preference to any other, since this is the one cited by Hattie and Timperley (2007) in their definition of "self-regulation", in relation to feedback.

Clark's (2012) review proposes an innovative "theoretical delineation" (Clark, 2012, p. 207) of the theory of formative assessment, which arises out of its post-structuralism philosophical basis. Clark (2012) explains that SRL is promoted via the setting of targets or goals that align with connected Assessment *for* Learning or Assessment *as* Learning practices, both of which are borne out of Social Cognitive Theory (Bandura, 1986) and sociocultural theories (e.g. Vygotsky, 1978). Such goals include engaging students in "discussions about study habits and strategies which sustain improvement", which includes using feedback, and providing "opportunities for students to become meta-cognitive and build knowledge of themselves as learners" (Clark, 2012, p. 222). This model of formative assessment positions feedback centrally, aiming to highlight its crucial position at the very core of formative assessment, which in turn seeks to develop strategies for SRL among students. This central placement of feedback echoes the literature (e.g. Black and Wiliam, 1998; Zimmerman, 2000), with the model visually articulating, for example, Butler and Winne's (1995) claim that feedback is pivotal to SRL.

The inner circles of Clark's (2012) model, i.e. those of primary relevance to this research study, show the two distinct theoretical pathways from feedback, to SRL, through promotion of either students' metacognition or self-efficacy. The model breaks down this metacognitive pathway from feedback to SRL into the component processes of "planning", "monitoring" and "reflecting". The self-efficacy, or affective, pathway from feedback to SRL is shown to comprise "ambition", "effort" and "persistence" processes.

However, whilst the quantitative analysis herein, based on the above internal pathways, attempts to relate the nature of teacher feedback to perceptions of students' SRL capabilities, this study of course recognises Ilgen et al.'s (1979) concern that "to relate feedback directly to behaviour is very confusing", with research findings being "contradictory and seldom straight-forward" (p. 368). Teachers can aim to employ language that is motivating to students (Stobart, 2018), based on increased understanding of their students' learning strategies and behaviours, however Dann (2017) dampens this with the realistic observation that "teachers can only

partially control and construct the impact of feedback" (p. 116). The ways in which students will interpret given feedback cannot be predetermined; students may mediate feedback, for example by accepting, rejecting, or modifying feedback (Kulhavy, 1977) in order to protect themselves emotionally, to reduce cognitive challenge or to better align it with their level of SRL abilities or priorities for learning (Boekaerts & Cascallar, 2006).

1.5 Factors associated with the nature of teacher feedback

Whilst the Hattie and Timperley (2007) four-level feedback model is widely discussed in education literature, only a relatively small collection of research studies have attempted to operationalise this towards the direct analysis of teacher feedback, with the ambition of understanding how the model describes teacher practices and with a view to provide suggestions on how feedback practices might be improved. Studies tend to be conducted within the context of teacher feedback in higher education (e.g. Arts et al., 2016; Dirkx et al., 2021; Lipsch-Wijnen & Dirkx, 2022; Derham et al., 2021); there have, however, been a minority that have focused instead on primary or secondary education (e.g. Brooks et al., 2019), or alternative forms of feedback, such as peer- or self-assessment comments (e.g. Harris et al., 2015).

Arts et al. (2016) first operationalise the Hattie and Timperley (2007) model to analyse the nature of tutor feedback on interim versions of research assignments for final-year university Biology students in the Netherlands. Of the comments classified as *feedback* (rather than *feedup* or *feedforward*) (88%), most feedback comments related to the task, very few referred to the self as a person, and each of feedback related to the processing of the task and feedback about SRL comprised approximately one quarter of the overall feedback. In combination with their analyse of rubric-referenced feedback, Dirkx et al. (2021) collected in-text feedback on written assignments of part-time Master's Applied Science students in the Netherlands, finding that the general distribution of in-text *feedback* comments (96% of total) showed similar trends, but with a greater tendency towards providing feedback about the task

and only approximately 15% being related to self-regulation. In contrast, Derham et al. (2021) report only 1% of in-text feedback comments on undergraduate Health Science and Psychology assignments to be related to self-regulation, or what they term informative developmental guidance, in combination with analysis of the linguistic features (c.f. Henderson et al., 2019) to consider the influence on students' affective and motivational states. Whilst also finding that *feedback* was the dominant function of feedback provided (94.3%), and that feedback about the task was the most common type of formative feedback given by lecturers to undergraduates at a University of Applied Science in the Netherlands, Lipsch-Wijnen and Dirkx's (2022) analysis of the combinations of types of feedback (e.g. "task and process"; "task and SRL") reveals the more complex nature of teacher feedback, concluding that this allows it to be tailored to specific learning goals.

Given the concern that research conducted in higher education may not reliably generalise to secondary education, Brooks et al.'s (2019) study of the types and levels of feedback (c.f. Hattie and Timperley, 2007) given to 11-13 year-old students in Australia is pertinent, in spite of the analysis relating to teachers' spoken, rather than written, comments. *Feedback* (rather than *feedup* or *feedforward*) was again found to be the most common type employed by teachers, but interestingly less prevalently (approximately 50%). Of this feedback, comments were predominantly related to the task (84%), with equally minor proportions of feedback about the processing of the task and about self-regulation. Whilst the difference in the observed contribution of *feedback* may indeed be a consequence of the education level, it could be argued that aspects of *feedup* and *feedforward* might otherwise have been categorised as "feedback about SRL", as there is considerable overlap across definitions.

A vast majority of the research literature focusses on the examination of the nature teacher feedback more generally, as discussed above, with limited studies attending to the issue of whether teachers provide feedback to students differently, according to student characteristics such as gender or year-level (e.g. Guo, 2020) and fewer still that have employed

the Hattie and Timperley (2007) framework for this purpose (e.g. Derham et al., 2021). With a primary focus of this study being associations between the nature of teacher feedback given and students' SRL abilities, it is pressing and informative to evaluate the, reasonably scant, research that has explored such relationships. For example, whilst adopting a more content-focussed classification of teacher feedback, rather than the Hattie and Timperley (2007) model, and with the nature of feedback determined via a Teacher Feedback Questionnaire (Guo, 2017) rather than direct analysis, Guo and Wei (2019) report, alongside other conclusions, that within the context of Mathematics in Chinese secondary education, an increase in the quantity of teacher praise, verification and scaffolding feedback all correlated with higher student metacognitive awareness (self-reported using the MSLQ). This study has similar ambitions for its scope of research, however uses an alternative feedback framework and a direct method of feedback data collection.

1.6 Research questions

With SRL being such an important competency for teachers and schools to develop within students, and with teacher written feedback remaining such a dominant formative assessment practice, it is of paramount importance for both researchers and practitioners to better understand the nature of this feedback and how it specifically relates to SRL.

To this end, this study with 11-13 year old boys, in the subject of English, aims to address the following research questions:

1. What is the nature of teacher feedback?
    a) What proportion of this feedback is focussed on promoting self-regulation?
    b) Where this feedback relates to self-regulation, what pathways towards SRL in students does it target?
2. How does the nature of teachers' written feedback given relate to student-perceived SRL ability?

3. How do teachers' perceptions of student SRL abilities relate to the nature of their written feedback?
4. How do teachers' perceptions of student SRL abilities relate to students' perceptions of their own SRL abilities?

2. Methodology

2.1 Research design overview

The quantitative study described in this chapter aimed to address the previously outlined research questions regarding the nature of teachers' written feedback to 11-13 year old boys in the subject of English, chosen as it is a core academic subject, and how this feedback is related to differences in both student and teacher perceptions of self-regulated learning (SRL). Figure 1 offers a schematic overview to illustrate the overall schedule of research activities discussed in the following sections.

2.2 Participants

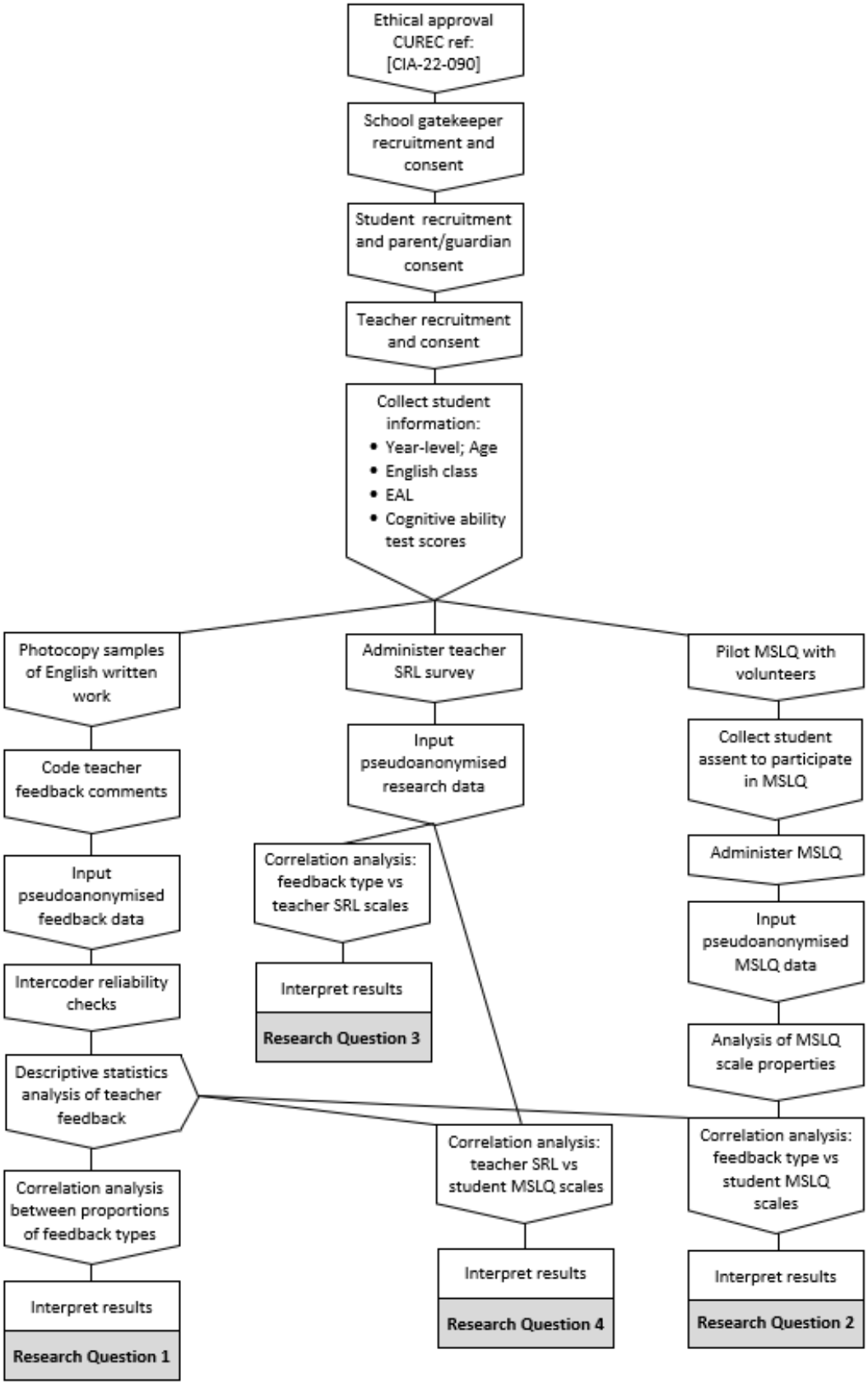
This study collected data from a convenience sample of 4 teachers and 75 students, detailed below, at a high socio-economic, boys-only, independent preparatory (8-13 years) school in England, UK. This non-probability method of sampling was chosen due to the availability of participants. Access to schools, teachers and student participants was made more challenging during, and immediately post, the Covid-19 pandemic; gatekeepers had reasonable concerns regarding the impact of any research on the teaching timetable, given extensive missed curriculum time.

2.2.1 Teacher participants

Following explanation of the research project demands to potential participant teachers via email and/or in-person, four volunteer English teachers consented to participate and were accepted into this study. Three teachers were male (pseudonyms Bob, Charles and David); one was female (pseudonym Anna). All teachers possessed more than 20 years of English teaching experience, with more than five years' experience in the specific context of the school in this study.

Figure 1

Schematic overview of research design, methodology and analysis



2.2.2 Student participants and classes

Student participants (*N* = 75) in this study were Year 7 boys (*N* = 38) with a mean age of 12.31 years (*SD* = .311) and Year 8 boys (*N* = 37) with a mean age of 13.32 years (*SD* = .299) attendant at the school. No further demographic information was collected about student participants, with the exception of whether they were listed on the school English as an Additional Language register; 34 students were found to have English as their non-native language, but all were categorised as "fluent" (except one student as "competent") according to Department for Education (2020) categories of English proficiency. These students were taught English within their academically-streamed classes, determined in part by students' age-standardised cognitive ability scores, and each participant teacher taught two classes across Year 7 and Year 8. Table 1 provides details about each sampled class, including class and English teacher pseudonyms used in this study and their academic profile; it is important to note that the latter refers to the academic stream within the context of the school cohort, rather than nationally. Table 1 also indicates what data was collected from students and teachers for each class, the nature of which is detailed in the next section.

2.3 Data collection

2.3.1 Teacher feedback

A number of studies have used self-report measures, e.g. Teacher Feedback Questionnaire (Guo, 2017), to investigate students' perceived frequency of different types of teacher-written feedback. To avoid associated issues of unreliability or self-report bias, this study collected photocopies of naturally-occurring teacher-written feedback given as formative assessment comments directly on students' extended pieces of writing (e.g. essays, creative compositions) in their English exercise books, having obtained both parent/guardian and participant teacher consent. Exercise books here refers to the notebooks in which students complete teacher-set assignments, rather than the structured workbooks more commonly

Table 1

Summary information about student participants and data collected

Year group (England)	Class pseudonym	Number of student participants	Mean age (in years)	Academic ability profile [a]	Mean age-standardised cognitive ability [b]	English teacher pseudonym	Data collected		
							Copies of extended English written work	Student-perception SRL measure (MSLQ)	Teacher-perception SRL measure
7	7A	14	12.31	High	135	Anna	✓	✓	✓
	7B	10	12.25	Middle	126	Bob	✓	✓	✓
	7C	6	12.31	Mixed / Lower	114	Bob	✓	✓	✓
	7D	8	12.38	Mixed / Lower	119	Charles		✓	✓
8	8A	7	13.43	High	133	Anna	✓	✓	✓
	8B	12	13.29	Mixed / Middle	126	Charles		✓	✓
	8C	10	13.27	Mixed / Middle	122	David		✓	✓
	8D	8	13.34	Lower	115	David		✓	✓

Note. [a] – academic profile refers to context of school year group cohort, not nationally

[b] – see Appendix A for details of measure

found in the American context. The data in this study were naturally-occurring teacher-written feedback comments. Extended written work included in the sample was only that completed prior to recruitment into the study, thus eliminating potential bias caused by changes to teachers' regular feedback practices.

Teacher-written in-margin, in-text and end-of-text comments were collected, with whole comments ranging in length from single words to longer, more developed one or two sentences, or sentence fragments. In-text revisions, such as direct correction of spelling and punctuation or suggestion of alternative vocabulary, were ignored in this study. Non-verbal marks, including ticks, circling or underlining, were also ignored. Where a comment comprised separate utterances, these were broken down and the thematic content of each was recorded individually. For example, Anna's comment "The style here is very good, but just double-check the vocabulary and syntax to make it perfect" was classified as two separate utterances, the first part being positive feedback about the quality of the work (Feedback about the task) and the second encouraging the student to check the standard of their work against their goals before submission (reflecting feedback). This followed the method of Harris et al. (2015), rather than adopting that of Lipsch-Wijnen and Dirkx (2022), which was to categorise combinations of consecutive feedback comments, such as "Task and Process", or "Task and Self-regulation"; it was felt that the latter approach would overcomplicate an already complex picture, given that feedback about SRL was being further broken down into subcategories.

Written work was sampled from Anna's classes (7A and 8A) and Bob's classes (7B and 7C); a sub-sample of 37 students. In total, across these four classes, 283 pieces of extended writing were collected, generating 2388 individual teacher-written feedback comments for analysis. A breakdown by class and by teacher of the work and feedback collected can be found in Appendix B. Whilst such a convenience sample including only two teachers may not be statistically representative, the number of feedback comments sampled was comparable to some studies (e.g. *N* = 2101 (Derham et al., 2021)) and significantly larger than others seeking to

categorise feedback by similar models (e.g. *N* = 299 (Arts et al., 2016); *N* = 289 (Harris et al., 2015)), deeming it sufficient to test the model for classifying teacher-written comments and to draw conclusions about the nature of their content.

2.3.2 Student-perception SRL measure

The Motivated Strategies for Learning Questionnaire (MSLQ) is considered an aptitude measure of SRL (Winne & Perry, 2000). The full MSLQ, as adapted for use in this study (see Appendix C), was an 81-item questionnaire containing 15 scales, divided into two parts: Part I. Motivation and Part II. Learning Strategies. All items were scored on a 7-point Likert-type scale (1 = *not at all true of me*; 7 = *very true of me*), with participants asked to circle the response that best describes them. Eight items were negatively-worded, reverse coded items for which ratings had to be reversed before score computations. Scale scores were based on mean averages across composite items in the scale, rather than sum totals.

With the MSLQ instrument originally being designed for an American, post-secondary educational context, the items were reviewed to ensure their content and language was accessible to 11-13 year-olds in a UK educational context, as well as directing students to reflect only on the subject of English, for example: “course” was replaced with “subject”; “instructor” was replaced with “teacher”; and “In a class like this” was replaced with “In English”. The sense and construct being tested was maintained in each case, but minor changes in wording were made in the case of all 81 items. The proposed revised MSLQ was piloted with a group of 11 volunteers (comprising both Year 7 and Year 8 students); they made suggestions for further minor changes to the language of eight items. Participant fatigue associated with the length of the full 81-item instrument was considered, however the volunteer group felt the demands of the questionnaire were reasonable; all items and scales were therefore retained in the MSLQ instrument administered.

The MSLQ was chosen for use in this study for multiple reasons, including its availability in the public domain, its modular nature, and its accommodation of course specificity (so items could be tailored to elicit responses related to only the subject of English). Other than self-report questionnaires which may introduce response bias, methods that could have been employed to measure self-regulated learning include think aloud protocols (e.g. Azevedo & Cromley, 2004), structured diary measures (e.g. Schmitz & Wiese, 2006) or observation methods (e.g. Perry et al., 2002). All of these were considered too time-demanding and burdensome for both teachers and students, particularly in the time during the Covid-19 pandemic.

The organisational structure of the MSLQ is detailed in Table 2, including for each scale the number of items it contains, as well as an example item. Part I. Motivation assesses value, expectancy and affective components of student motivation via six scales: “Intrinsic goal orientation”; “Extrinsic goal orientation”; “Task value”; “Control of learning beliefs”; “Self-efficacy for learning”; and “Test anxiety”. Part II. Learning Strategies assesses cognitive and metacognitive strategies and resource management strategies via nine scales: “Rehearsal”; “Elaboration”; “Organisation”; “Critical thinking”; “Metacognitive self-regulation”; “Time and study environment”; “Effort regulation”; “Peer learning”; and “Help seeking”.

2.3.3 Teacher-perception SRL measure

A survey instrument (see Appendix D) was devised to measure participant teachers’ perception of their students’ abilities in two separate aspects of SRL: Part I. Metacognitive self-regulation (SR) and Part II. Self-efficacy. Detailed description was provided to ensure teachers understood the operational definition of these aspects, as well as what high levels might look like in students’ learning behaviour. Teachers were required to indicate their rating on a 7-point Likert-type scale (1 = *very low*; 2 = *below average level*; 3 = *slightly below average level*; 4 = *average level*; 5 = *slightly above average level*; 6 = *above average level*; 7 = *very high*) for each named student, according to how strong they perceived that student’s levels of metacognitive

Table 2

Scale information, sample items, descriptive statistics and internal consistency coefficients (Cronbach's α) for the scale variables measured using the MSLQ in the current study, compared to the manual (Pintrich et al., 1991)

Scale	Sample item (number of items in scale)	*N*	*M*	*SD*	Cronbach's α	
					Current study	Manual
Overall MSLQ (full instrument)	(81)	60	4.69	.51	.899	n/a
Motivation section						
Intrinsic goal orientation	In English, I prefer material that really challenges me so I can learn new things (4)	73	5.01	.93	.532	.74
Extrinsic goal orientation	Getting a good grade in English is the most satisfying thing for me right now (4)	74	5.49	.90	.531	.62
Task value	It is important for me to learn the material in English (6)	72	5.59	.88	.754	.90
Control of learning beliefs	If I try hard enough, then I will understand the material in English (4)	75	5.05	.86	.450	.68
Self-efficacy for learning	I am confident I can master the most complex material presented by my English teacher (8)	74	5.17	.95	.882	.93
Test anxiety	I feel my heart beating fast when I take an English test (5)	75	3.76	1.24	.706	.80

Table 2 continued

Scale information, sample items, descriptive statistics and internal consistency coefficients (Cronbach's α) for the scale variables measured using the MSLQ in the current study, compared to the manual (Pintrich et al., 1991)

Scale	Sample item (number of items in scale)	*N*	*M*	*SD*	Cronbach's α	
					Current study	Manual
Learning Strategies section						
Rehearsal	When I study for English, I practise reading the material to myself over and over (4)	75	3.81	1.28	.691	.69
Elaboration	When reading for English, I try to relate the material to what I already know (6)	73	4.74	1.02	.686	.76
Organisation	When I study the course materials for English, I outline the content to help me organise my thoughts (4)	73	3.93	1.11	.652	.64
Critical thinking	Whenever I read or hear an opinion or conclusion in English, I think about possible alternatives (5)	73	4.76	.88	.503	.80
Metacognitive self-regulation	When reading for English, I make up questions to help focus my reading (12)	73	4.56	.88	.758	.79
Time and study environment	I have a regular place set aside for studying English (8)	75	5.01	.95	.741	.76
Effort regulation	I work hard to do well in English, even if I don't like what we are doing (4)	74	5.57	1.16	.791	.69
Peer learning	I try to work with other students from my class to complete the assignments in English (3)	74	3.28	1.26	.569	.76
Help seeking	I ask my English teacher to clarify concepts I don't understand well (4)	74	4.16	1.19	.551	.52

SR and self-efficacy to be, in the subject of English, compared to other 11-13 year olds they have taught over the years in this type of educational setting. A 7-point scale was chosen to balance discrimination between students and burden on teachers, and, unlike the established MSLQ instrument, labels were provided for each value rating on the scale to support the reliability of responses. An overall mean scale measure of teacher-perceived students' SRL was calculated from these two measures of "Metacognitive SR" and "Self-efficacy".

2.4 Procedure

2.4.1 Recruitment and informed consent

Prior to commencement of the study, gatekeeper approval for the research was obtained from the Headmaster and informed consent obtained from participant teachers, following supplication of written project information. The student research participants, 11-13 year-olds, were classed as vulnerable within the context of this research (BERA, 2018); as such, informed consent from a parent or guardian was required via an online form, following email communication enclosing project information sheets (see Appendix E). This information outlined: what the study involved; why their child was being asked to participate; what would be involved; any associated advantages or harm arising from participation; data protection issues, e.g. how and when data provided would be collected, used, reported, stored and destroyed; and how confidentiality would be ensured, i.e. via pseudoanonymisation.

Student participants were considered old enough to understand and have investment in the research project, so the project was summarised in an assembly on the morning of data collection. Upon arrival at their MSLQ administration session, students were invited to read a project information sheet (see Appendix F) and given opportunity to ask any questions, before signing a form providing their assent to participate. Students were reminded that they were free to withdraw at any time, without penalty and without having to provide explanation.

2.4.2 Collection of teacher feedback

English exercise books were collected in from participant teachers Anna and Bob at convenient times during the research period and photocopied on site immediately.

2.4.3 Administration of student-perception SRL measure

The MSLQ was administered to Year 7 and Year 8 students in two separate Private Study sessions. Instructions for completion, also written on the cover sheet, were read aloud by the researcher, including explanation of the 7-point Likert-type response scale. MSLQ completion took between 10 and 20 minutes for the majority. Having the researcher present enabled any queries or uncertainties to be addressed immediately and the immediate collection of responses by the researcher aimed to encourage students to be as honest as possible. These factors were balanced with a concern over researcher presence being perceived as threatening or exerting compulsion to participate (Cohen et al., 2018, p. 502). A single follow-up session was organised for any students who had been absent for the main testing session.

2.4.4 Administration of teacher-perception SRL measure

Hard copies of the teacher-perception SRL survey were provided to all participant teachers. Responses were collected by the researcher via post.

2.5 Data analysis

2.5.1 Nature of teacher feedback

In order to address Research Question 1, regarding the nature of teacher feedback, this study used a priori content analysis to classify teachers' written feedback comments according to a protocol incorporating aspects of Clark's (2012) model and Hattie and Timperley's (2007) four levels of feedback model: "Feedback about the task"; "Feedback about the processing of the task"; "Feedback about the self as a person"; and "Feedback about self-regulation" (see Figure 2(a)). This model has been adopted in a number of previous studies analysing feedback

comments (e.g. Arts et al., 2016; Dirkx et al., 2019; Harris et al., 2015), positioning it as a useful foundational framework. Feedback about the self has been argued to rarely be effective (Hattie & Timperley, 2007) and some studies into the nature of teacher feedback have consequently ignored this category from investigation (e.g. Brooks et al., 2019). However, in order to accommodate a wider definition of SRL, such as that captured by Clark (2012), elements of the original "Feedback about the self as a person" level related to self-efficacy, such as effort, have been incorporated in this study as part of a redefined category, titled "Feedback about self-regulated learning (SRL)". A more limited "Feedback about the self as a person" level remains in the model to include residual aspects of personal feedback, for example "Good boy". This redefined "Feedback about the self as a person" joins "Feedback about the task" and "Feedback about the processing of the task" as being encompassed by a "Feedback not about self-regulated learning (SRL)" overarching category (see Figure 2(b)).

As it is a broad category, and to better investigate the pathways from self-regulation feedback to self-regulated learning in students, the redefined category "Feedback about SRL' was broken down into six sub-aspects to reflect Clark's (2012) model: three "metacognitive" pathways ("planning", "monitoring" and "reflecting") and three "self-efficacy" pathways ("ambition", "effort" and "persistence"); see Figure 2(c) and 2(d)). Table 3 details how this framework formed the basis of the coding scheme for teacher feedback in this study, along with example feedback comments.

Using Lombard et al.'s (2002) guidelines regarding procedures for assessing and reporting intercoder reliability in content analysis studies, the reliability of the feedback coding scheme was verified. Some studies (e.g. Harris et al., 2015) report lower than ideal reliability indices, attributing this to the complexity of classifying comments without access to the author's intentions. Additionally, nuanced differences in language and punctuation, such as the addition of a question mark, rendered subtly different meanings to feedback comments. In a large

proportion of cases, the classification of feedback comments in this study involved coding latent content, rather than merely manifest content; as such, subjective interpretations were required, thereby increasing the importance of establishing a high level of reliability, to ensure rater judgements were intersubjective (Potter & Levine-Donnerstein, 1999). Where comments could be argued to fit into more than one category, the feedback type identified by the rater as most closely aligned was chosen, for example: “You have worked hard to achieve originality and vividness” (Anna) could relate to both “effort” feedback or “Feedback about the task”; “Aim to plan your argument more carefully” (Anna) could relate to both “ambition” or “planning” feedback. For the purposes of analysis in this study, the consensus of the three raters was taken for each feedback comment. Where a majority existed in the rater judgement, this was taken forward. Where all three raters disagreed, the discrepancy was discussed, reconciled and the final judgement agreed upon.

Figure 2

Framework for classifying teachers’ feedback comments and its development

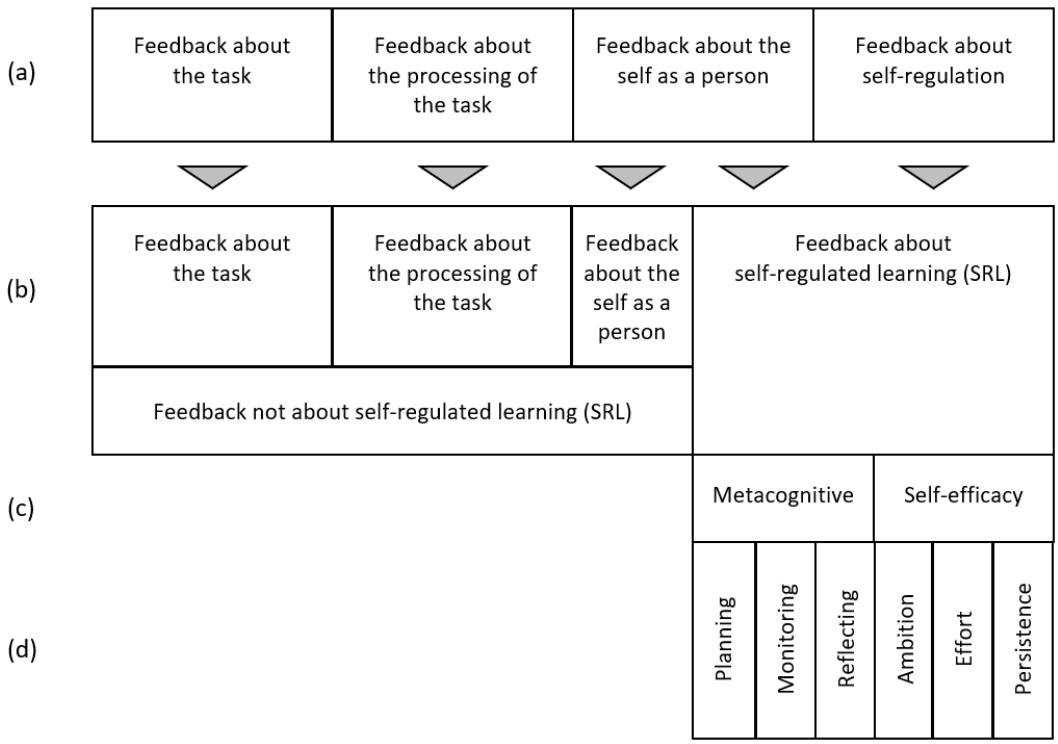


Table 3

Coding scheme for teachers' written feedback comments based on feedback framework

Feedback type		Code	Category description	Examples of feedback comments
Feedback not about SRL	Feedback about the task	1	Descriptive comments about: substance of the work; quality of the work achieved; performance on the task; correctness of content; factual knowledge relating to the task for reference; and specific praise that is clearly linked to the task by proximity.	Good *{in margin, next to two ticks, related to specific point made}* (Anna); The vocabulary you have chosen and the sentence structures sound entirely authentic (Anna); Many strong and interesting points (Bob)
	Feedback about the processing of the task	2	Comments about processing information or cognitive strategies underpinning the work, including: rehearsal; elaboration; organisation; and critical thinking.	Your explanations need further detail, answering 'how?' and 'why?' (Anna); You used the suggested techniques well (Bob)
	Feedback about the self as a person	3	Unspecific praise (where not linked by proximity to specific part of text, usually found at the end); personal comments; comments unrelated to the task.	You can turn your hand to any topic (Anna); Well done *{at end of text}* (Bob); You have a gift (Bob)

Table 3 continued

Coding scheme for teachers' written feedback comments based on feedback framework

Feedback type			Code	Category description	Examples of feedback comments
Feedback about SRL	Metacognitive	Planning	4	Comments about planning activities, including: time-management; strategy selection; goal setting; task analysis; and application of background knowledge.	Aim to plan your argument more carefully (Anna); You did not give yourself enough time to check this carefully (Bob)
		Monitoring	5	Comments about: monitoring activities to think about or do consistently during the task; and the continuous fine-tuning of cognitive processes, including: tracking attention; self-questioning while reading; monitoring progress towards goals; and monitoring of learning behaviours and motivations.	Don't let your handwriting get too small though (Anna); Careful to remain in the first person (Anna); Concentrate! (Bob)
		Reflecting	6	Comments about reflecting activities employed part way through a task, at the point of completing a task, or after receiving feedback, including: evaluating cognitive processes; checking work or progress against goals; critical reflection on past work and extent to which strategies facilitated or frustrated the realisation of goals.	Remember to check your sentence punctuation (Anna); How carefully did you read this? (Bob); You were told to check you had not muddled your tenses (Bob); Do you see how that word improves it? (Bob)

Table 3 continued

Coding scheme for teachers' written feedback comments based on feedback framework

Feedback type			Code	Category description	Examples of feedback comments
Feedback about SRL	Self-efficacy	Ambition	7	Comments about: setting personal goals; forward-looking outlook; choosing more challenging tasks where choice offered; and students' beliefs about their ability to control the level of their performance.	If you improved your handwriting you could achieve the highest marks (Anna); Target – now aim to think more carefully about your paragraphing (Bob)
		Effort	8	Comments about how much effort has been expended, regardless of the task.	Excellent effort on this explanation […], as always! (Anna); You have tried very hard here (Bob)
		Persistence	9	Comments about: ability to employ mental strategies to strengthen engage with and complete the task, even if boring or difficult; belief in ability to succeed in face of challenges; aspects of help seeking.	I'm not sure if this is finished or not? (Anna); Perhaps it's just that you worked too slowly and not finished what you set out to do? (Bob); Ask! (Bob)

While Cohen's kappa is a commonly utilised measure of interrater reliability, this study employed Krippendorff's alpha (Hayes & Krippendorff, 2007), due to its flexibility regarding the number of raters, sample size and handling of missing data. After preliminary explanation of the draft coding scheme, the author and two research assistants[1] independently coded all feedback comments present on four pieces of written work. Following refinement of the coding scheme, a formal pilot test was conducted, involving all three raters independently coding 30 randomly selected pieces of written work; an adequate level of agreement (Krippendorff's alpha .632) was reached. In the case of the above training and formal pilot stages of reliability checking, the pieces of written work included, rather than being part of the full sample to be coded, were randomly selected from students removed from the study due to missing data elsewhere. Considerable further rater training and discussion proceeded a formal reliability checking stage, in which a random selection of 10% of the total feedback comments (*N* = 239) were independently coded by all three raters. For a more conservative index such as Krippendorff's alpha, within a small study such as this, the resulting coefficient of .701 overall was deemed appropriate to continue (Lombard et al., 2002) (.622 for Anna's feedback separately; .728 for Bob's). The remaining comments were coded solely by the author, as a compromise based on time, availability of research assistants and maximising reliability.

Descriptive statistics for teacher feedback variables including total number of comments, number of sampled pieces of work and average number of comments per piece were calculated, as well as descriptive statistics for the proportion of each of the feedback types in the framework as a percentage of the total feedback. Furthermore, Pearson correlations (two-tailed, pairwise) were run to reveal any associations in teachers' usage of the different types of feedback. Correlations were run pairwise, to maximise the data available to the analysis, and two-tailed, because the relationship could plausibly exist in either direction.

[1] Research assistants were family members who were only involved in the study to this extent.

2.5.2 Relationships between teacher feedback and student-perceived SRL ability

To address Research Question 2, scatterplots were scrutinised for linear relationships and Pearson correlations (two-tailed, pairwise) were computed to explore the associations between the different types of teacher feedback given and the various aspects of student-perceived SRL ability, measured by the adapted MSLQ.

2.5.3 Relationships between teacher feedback and teacher-perceived SRL ability

Analysis directed at addressing Research Question 3 again involved scrutinising scatterplots for linear relationships and computing Pearson correlations (two-tailed, pairwise), to explore the relationships between the different types of teacher feedback given and teachers' own perceptions of their students' SRL capabilities, as measured by the teacher survey.

2.5.4 Relationships between teacher and student perceptions of SRL ability

To address Research Question 4, regarding how teachers' perceptions of student self-regulated learning abilities relate to students' perceptions of their own self-regulated learning abilities, scatterplots were scrutinised for linear relationships and Pearson correlations (one-tailed, pairwise) were computed to explore the associations. One-tailed correlations were found in this case, as it was hypothesised that the effect would exist in only a single direction; if a teacher had a high perception of a students' SRL ability, the student was more likely to report high scores for their own SRL abilities, via the adapted MSLQ.

2.6 Ethical considerations

In accordance with the University of Oxford's policy on the ethical conduct of research involving human participants and personal data (CUREC, 2019), this study sought review and received approval from the Central University Research Ethics Committee (CUREC) (see Appendix G). Furthermore, all research was conducted within the framework of guidelines set out by the British Educational Research Association (BERA, 2018). In addition to those

considerations previously discussed in earlier sections, including collection of informed consent, there existed a number of key ethical considerations when designing and conducting this specific study.

Gatekeeper informed consent was obtained before any participants were approached and all of the school's own safeguarding procedures were adopted. The researcher was always chaperoned by a member of school staff whilst moving around the school and interacting with students at MSLQ administration sessions.

Consideration needed to be given to the power relationships arising from the dual role of researcher and former teacher at the school and their impact on students and teachers. It was essential to ensure students did not feel coerced or pressured to participate, at any stage, by school management, due to any desire not to offend the researcher, especially if known to them, or any peer pressure. As previously mentioned, reminders were regularly given that ongoing consent was voluntary and could be freely withdrawn at any time, without explanation or consequence. Whilst this study aims to provide critical analysis intendent on improving marking and feedback practices, participant teachers were reassured in advance that focus was primarily on the nature of their feedback, and not a judgement or criticism of either their marking or the standard of students' work.

3. Results

3.1 Overview

This chapter reports the results of the statistical analyses described in the previous Methodology chapter, conducted with view to addressing the four research questions posed in the Introduction of this research study (see Page 22).

3.2 Testing assumptions

In order to conduct parametric tests, first the assumption of normality was evaluated and confirmed, a process particularly important given the small sample size in this study. Initially, participants with *z*-scores greater than 3 were identified for all outcome variables of interest to the analysis. Histograms and boxplots were also considered. In the interest of maximising the sample size, and to avoid a reduction in generalisability of findings, students were only removed from the sample in cases where the absolute value of the *z*-score was greater than 3.29, i.e. significant at $p < .001$ (Field, 2018, p. 39). Three outlying students were removed from the dataset as a result (see Table H1, Appendix H for details).

Following the removal of these outliers, further evaluation was conducted by calculating skew and kurtosis statistics. Initially, variables for which skewness and/or kurtosis statistics had an absolute value greater than 1 were identified (see Appendix I). Importantly, this revealed virtually all scales in the MSLQ to be functioning within reasonable bounds of normality or exhibiting only slight skew, consistent with values reported by Pintrich et al. (1993). Whilst the MSLQ "Effort regulation" scale was found to be slightly skewed ($M = 5.57$, $SD = 1.16$, skew = -1.056), it was included in further analysis as it constituted a crucial variable for study, being encapsulated in a wider definition of self-efficacy.

Deemed to contravene the assumption of normality, variables were removed from further analysis in cases where values for skewness and kurtosis were both greater than 1.50 and the *z*-score for skewness and *z*-score for kurtosis were both greater than 3.29, i.e. significant

at $p < .001$ (Field, 2018, p. 248). Two variables were removed from further analysis as it was felt that the skew was so pronounced that not even non-parametric testing would be appropriate: the proportion of "planning" feedback and the proportion of "persistence" feedback (see Appendix I for details).

3.3 Nature of teacher feedback

This section aims to address Research Question 1, i.e. what is the nature of teachers' written feedback given to 11-13 year-old boys in the subject of English, with specific focus on what proportion of feedback given is targeted to promoting SRL and, where the feedback is focussed on promoting SRL, to which pathways towards SRL it relates.

Descriptive statistics were run for the number of pieces of extended written work sampled for each student ($N = 37$), the total number of teacher feedback comments and the average number of teacher feedback comments per piece per student. Per student, the range of 5 to 9 pieces sampled ($M = 7.65$, $SD = 1.14$) generated a total of 19 to 155 comments ($M = 65.54$, $SD = 43.38$). Per piece, the average number of comments ranged from 2.90 to 21.86 ($M = 8.58$, $SD = 5.72$). Breaking this down, the large range and standard deviation in the average number of comments per piece can be attributed primarily to the different teachers; across Anna's students, $M = 4.06$ ($SD = .76$) compared to for Bob's students, $M = 14.51$ ($SD = 3.41$). More detailed breakdown by teacher can be found in Appendix B.

The type of teacher feedback comments according to the categories of the coding scheme can be seen in Table 4, with the average number of comments per piece listed, as well as the percentage of each type given as a percentage of the total feedback; the latter will be the primary focus of analysis and discussion. Only comments coded as "Feedback about the task" were present in all pieces of work in the sample. Only an average of 0.2% ($SD = 0.7\%$) of comments were categorised as "planning" and only an average of 0.5% ($SD = 1.0\%$) were categorised as "persistence". Due to the low numbers of comments of these types, and as

Table 4

*Descriptive statistics (*N *= 37) for average number of comments per piece for different teacher feedback types and proportions of each type as a percentage of the total feedback given*

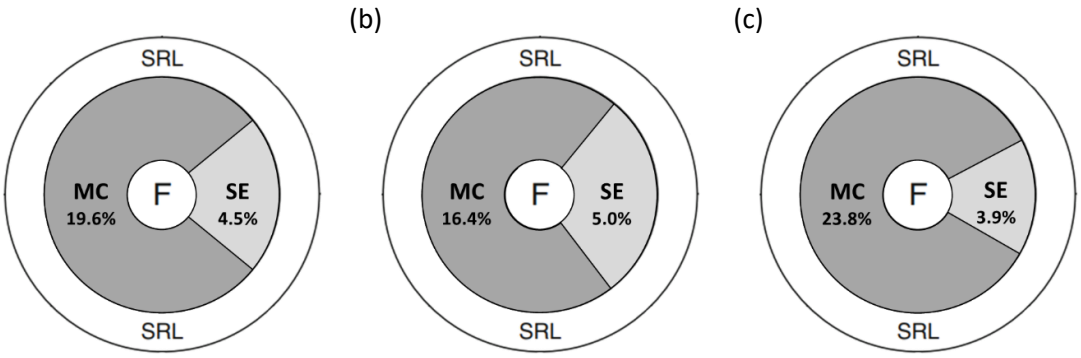
	Average number of comments per piece				Proportion of total feedback (%)			
Feedback type	**Min**	**Max**	***M***	***SD***	**Min**	**Max**	***M***	***SD***
Feedback about the task	1.75	11.38	5.12	3.18	45.2	73.6	61.6	8.3
Feedback about the processing of the task	.00	1.38	.41	.38	0.0	9.6	4.5	2.4
Feedback about the self as a person	.00	2.29	.77	.60	0.0	23.1	9.8	5.5
Feedback not about SRL	2.38	14.29	6.30	3.87	60.4	96.2	75.9	8.6
Planning	*.00*	*.38*	*.02*	*.08*	*0.0*	*2.8*	*0.2*	*0.7*
Monitoring	.00	.67	.26	.20	0.0	17.9	4.8	5.3
Reflecting	.00	6.57	1.64	1.82	0.0	33.8	14.5	8.9
Feedback about SRL (Metacognitive)	.11	6.57	1.92	1.81	3.8	36.0	19.6	7.9
Ambition	.00	.50	.16	.13	0.0	10.5	2.9	3.1
Effort	.00	.86	.15	.25	0.0	5.3	1.1	1.6
Persistence	*.00*	*.43*	*.06*	*.11*	*0.0*	*3.3*	*0.5*	*1.0*
Feedback about SRL (Self-efficacy)	.00	1.14	.36	.32	0.0	11.4	4.5	3.1
Feedback about SRL	.51	7.57	2.28	1.85	3.8	39.6	24.1	8.6

discussed previously, these two variables were removed from further analysis as they were deemed not to meet the required assumption of normality.

Overall, a considerable majority of comments (*M* = 75.9%) were found to be "Feedback not about SRL", with "Feedback about the task" contributing most significantly to this, with 61.6% of comments categorised as such, on average. Smaller proportions of comments were categorised as "Feedback about the self as a person" (*M* = 9.8%) and "Feedback about the processing of the task" (*M* = 4.5%). Therefore, on average, 24.1% of comments were considered to be "Feedback about SRL", with 19.6% relating to metacognitive pathways compared to only 4.5% associated with self-efficacy pathways to SRL; see Figure 3(a). The largest contributor to "Feedback about SRL (Metacognitive)" was the "reflecting" pathway (*M* = 14.5%), followed by the "monitoring" pathway, to a much lesser extent (*M* = 4.8%). Equivalently, the largest contributor to "Feedback about SRL (Self-efficacy)" was the "ambition" pathway (*M* = 2.9%), followed by the "effort" pathway (*M* = 1.1%).

Figure 3

Proportions of "Feedback about SRL" relating to "Metacognitive (MC)" and "Self-efficacy (SE)" pathways, from feedback (F) at the centre of the model to SRL (adapted from Clark (2012))



Note. (a) overall, full sample; (b) for Anna's feedback; and (c) for Bob's feedback

Percentages shown refer to the proportion of "Feedback about SRL (Metacognitive (MC))" and "Feedback about SRL (self-efficacy (SE))" of the total teacher feedback given, rather than of "Feedback about SRL".

Breaking down the proportions of each feedback type by teacher, it was interesting to observe that, although the total amount of feedback varied greatly, the proportions of feedback types used varied less considerably (see Appendix J). “Feedback not about SRL” was found, on average, to form 78.6% of Anna’s comments and 72.3% of Bob’s, with contributions from constituent “Feedback about the task”, “Feedback about the Processing of the Task” and “Feedback about the self as a person” categories being in similar ratios to the overall sample for both teachers. Comparison by teacher of the proportion of “Feedback about SRL” that was found to target SRL via metacognitive and self-efficacy pathways can be seen in Figures 3(b) and (c). Difference in the feedback patterns for the two teachers was evident in the contribution of individual “monitoring” and “reflecting” pathways to the collective metacognitive category: for Anna, this contribution was more equivalent (*M* = 7.2% and 9.1% respectively); for Bob, this was significantly greater for “reflecting” pathways (*M* = 21.7%), compared to “monitoring” (*M* = 1.7%). There was also a difference in the teachers’ relative employment of comments relating to “ambition” and “effort” within the self-efficacy category: for Anna, this was significantly in favour of “ambition” pathways (*M* = 4.3%), compared to “effort” (*M* = 0.3%); for Bob, “effort” feedback (*M* = 2.1%) was found to be double the proportion of “ambition” feedback (*M* = 1.0%).

Table 5 shows the correlations between the different types of teacher feedback; the strengths of such correlations were evaluated according to one example of a conventional approach, as throughout the rest of this study: .80 - 1.00 (*very strong*); .60 - .80 (*strong*); .40 - .60 (*moderate*); .20 - .40 (*weak*); and .00 to .20 (*very weak*). Generally, the pattern of these overall correlations provides broad support for the validity and reliability of the feedback coding according to the model in Figure 2; the strength and direction of correlations were largely as might have been expected. An exception to this is the lack of correlation between “Feedback about the processing of the task” and “Feedback not about SRL”; this may point to considerable overlap between the coding of “Feedback about the processing of the task” and either “monitoring” or “reflecting” feedback. Correlations are reported here where they provide

Table 5

Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types

Teacher feedback type	1	2	3	4	5	6	7	8	9	10	11
1. Feedback about the task	–										
2. Feedback about the processing of the task	-.32	–									
3. Feedback about the self as a person	-.23	.08	–								
4. Feedback not about SRL	**.74*****	.02	**.44****	–							
5. Monitoring	-.07	-.23	-.06	-.17	–						
6. Reflecting	**-.57*****	.19	**-.35***	**-.72*****	**-.48****	–					
7. Feedback about SRL (Metacognitive)	**-.70*****	.07	**-.43****	**-.93*****	.13	**.80*****	–				
8. Ambition	.01	-.30	-.04	-.10	.29	**-.36***	-.21	–			
9. Effort	**-.48****	.16	-.15	**-.52****	-.09	**.47****	**.47****	-.30	–		
10. Feedback about SRL (Self-efficacy)	-.26	-.23	-.11	**-.39***	.15	-.07	.02	**.81*****	.23	–	
11. Feedback about SRL	**-.74*****	-.02	**-.44****	**-1.00*****	.17	**.72*****	**.93*****	.10	**.52****	**.39***	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

additional detail to that provided by the proportion of feedback analysis discussed above.

Individually, “Feedback about SRL” was strongly positively correlated with the “reflecting” pathway (r = .72, p < .001) and moderately positively correlated with the “effort” pathway (r = .52, p = .001), despite a greater percentage of total feedback given being categorised as “monitoring” or “ambition” compared to “effort” feedback, and despite the “ambition” pathway being that most strongly correlated with the collective self-efficacy pathways (r = .81, p < .001). Students who received more feedback about “effort” also tended to receive more feedback related to “reflecting” (r = .47, p = .003), and indeed “Feedback about SRL (Metacognitive)” (r = .47, p = .004), despite these relating to different constructs. “Feedback about SRL” was only very weakly, non-significantly correlated with the “monitoring” pathway (r = .17, .310) and the “ambition” pathway (r = .10, p = .550).

There was considerable variation in the patterns and strengths of correlations seen among the types of feedback variables for both Anna and Bob’s comments taken separately; full correlation tables can be found in Appendix K. Again, these are reported here where they provide additional detail to that provided by the proportion of feedback analysis discussed above. Reflecting the overall pattern observed, Bob’s students who received more feedback about “effort” tended to receive more feedback about “reflecting” (r = .67, p = .005), and overall “Feedback about SRL (Metacognitive)” (r = .59, p = .016). In contrast, Anna’s students who received more “effort” feedback tended to receive less “reflecting” feedback (r = -.50, p = .020), but instead, more “monitoring” feedback (r = .53, p = .014). No significant correlation was found between the “effort” pathway and the overall “Feedback about SRL (Metacognitive)” (r = .01, p = .972) for Anna’s students. As in the case for the full sample, for Bob’s feedback “Feedback about SRL” was very strongly positively correlated with the “reflecting” pathway (r = .916) and strongly correlated with the “effort” pathway (r = .680). There was, however, a very weak negative correlation between the overall “Feedback about SRL” and the “ambition” pathway (r = -.012), with “ambition” feedback representing the lowest proportion of Bob’s total feedback

(*M* = 1.0%). For Anna's feedback, "Feedback about SRL" was similarly positively correlated with individual "monitoring", "reflecting" and "ambition" pathways (*r* = .586, .540 and .513 respectively), in this case it being the "effort" pathway that was only weakly correlated (*r* = .167), due to its low proportion of Anna's total feedback (*M* = 0.4%). The pattern of relationships between the types of feedback given was clearly specific to each teacher.

3.4 Properties of student-perception SRL measure

The primary focus of this research study was not to analyse and improve the reliability and validity of the MSLQ, however performed statistical checks ensured that this student SRL measure (utilised in addressing Research Questions 2 and 4) functioned in the manner expected (as compared to the original manual (Pintrich et al., 1991)), for this sample population.

15 MSLQ surveys had various missing data on individual items, constituting 20% of the full sample. Whilst numerous other studies have removed these cases from the final sample (e.g. Jackson, 2018; Nielsen, 2018), to do so here would have been too significant a reduction in sample size for this small study. Bin Davel et al. (2018) alternatively used multiple imputation techniques to replace missing values prior to analysis, however replicating this method considerably risked finding artificially significant effects and overfitting data to models. A compromise of running correlations pairwise was settled upon, to maximise the number of participants in each correlation.

Table 2, in the previous section, details the descriptive statistics for each of the 15 MSLQ scales, as well as an overall MSLQ measure, for the sample. Cronbach's alpha reliability estimates for this study were also compared to those reported by Pintrich et al. (1991). The scales had reliability coefficients ranging from .450 to .882, compared to the .52 to .93 reported in the manual, with the full 81-item instrument having a high Cronbach's alpha of .899. "Rehearsal", "Organisation", "Effort regulation" and "Help seeking" scales all demonstrated higher internal consistency than the manual. The remaining scales all showed more variability in

student responses, with the greatest difference in reliability coefficients being for the “Critical thinking” scale; see Table L1 (Appendix L) for further details.

Few studies have been found to report any analysis of the impact of removing individual items on internal consistency, however. Cronbach’s alpha estimates were re-calculated for scales if each individual item was removed; see Table L2 (Appendix L) for cases where item removal improved internal consistency. As the scales have been validated in previous literature, all items would ideally be used, so where only marginal improvement in Cronbach’s alpha was found (less than .03 increase), items were left in. The removal of two individual items were found to significantly improve the overall internal consistency of their respective scales by greater than .10, and bring coefficients and descriptive statistics of these revised scales more in line with those reported in the manual (see Table 6). Removing Item 24 (“When I have the opportunity in English, I choose assignments that I can learn from, even if they don’t guarantee a good grade”), increased alpha for the “Internal goal orientation” scale from .532 to .676, perhaps because sampled students are given fewer opportunities to exercise such choice. Removal of Item 2 (“If I study in appropriate ways, then I will be able to learn the material in English”), from the “Control of learning beliefs” scale increased alpha from .450 to .566. Revised scales with these items removed, as in Table 6, were employed in future analysis. This led to only a minor reduction in the internal consistency of the revised 79-item instrument, from .899 to .897. Whilst removing Item 58 (“I ask my English teacher to clarify concepts I don’t understand well”) also led to an increase in alpha for the “Help seeking” scale (from .551 to .661), this item was left in; not only did it represent an important part of the construct, particularly in light of its contribution to the aspect of “persistence”, but the alpha coefficient for the “Help seeking” scale was already higher than for the manual (.52).

Finally, correlations run among the MSLQ scales themselves generally demonstrated a similar broad pattern of results to those discussed elsewhere (Pintrich et al. 1991, 1993), suggesting the scales were operating as expected, but perhaps with *r* values being comparatively

Table 6

Descriptive statistics and internal consistency coefficients (Cronbach's α) for the revised MSLQ scale variables used in future analysis, compared to the manual (Pintrich et al., 1991)

Scale	Sample item (number of items in scale)	*N*	*M*	*SD*	Cronbach's α	
					Current study	Manual
Overall MSLQ (revised)	(79)	60	4.71	.51	.897	n/a
Intrinsic goal orientation (revised)	In English, I prefer material that really challenges me so I can learn new things (3)	73	5.22	1.06	.676	.74
Control of learning beliefs (revised)	If I try hard enough, then I will understand the material in English (3)	75	4.82	1.08	.566	.68

lower across a majority of correlations. Further detail can be found in Appendix M.

3.5 Relationships between teacher feedback and student-perceived SRL ability

First, mean scores for students' perceptions of their SRL capabilities (see Table 2), were examined according to Oxford's (1990) standard ranges for a 7-point Likert scale, i.e. high level for scores in the range 4.9 – 7.0, medium level for 3.5-4.8, and low level for 1.0 - 3.4. Overall, according to the revised 79-item scale, students demonstrated a medium level of self-regulation (*M* = 4.71, *SD* = .51). Relating to motivation, students reported high levels for "Intrinsic goal orientation" (*M* = 5.22, *SD* = 1.06), "Extrinsic goal orientation" (*M* = 5.49, *SD* = .90), "Task value" (*M* = 4.71, *SD* = .51), "Control of learning beliefs" (*M* = 4.82, *SD* = 1.08) and "Self efficacy for learning" (*M* = 5.17, *SD* = .95), but only medium levels of "Test anxiety" (*M* = 3.76, *SD* = 1.24). Within the Learning Strategies section, high scores were only reported for "Time and study environment" (*M* = 5.01, *SD* = .95) and "Effort regulation" (*M* = 5.57, *SD* = 1.16). Students reported medium levels of "Metacognitive self-regulation" (*M* = 4.56, *SD* = .88) and use of metacognitive strategies: "Rehearsal" (*M* = 3.81, *SD* = 1.28); "Elaboration" (*M* = 4.74, *SD* = 1.02); "Organisation" (*M* = 3.93, *SD* = 1.11); and "Critical thinking" (*M* = 4.76, *SD* = .88). Finally, students reported medium levels of "Help seeking" behaviour (*M* = 4.16, *SD* = 1.19), but only low levels of "Peer learning" behaviour (*M* = 3.28, *SD* = 1.26).

To address Research Question 2, namely to determine whether there were relationships between the proportions of different feedback types used by teachers and students' own perceptions of their SRL abilities (according to the self-report MSLQ measure scales), scatterplots were scrutinised for linear relationships and Pearson correlations (two-tailed, pairwise) were calculated. Table 7 shows correlations between the average proportions of feedback types with the MSLQ scales. Students who scored more highly on the self-reported "Intrinsic goal orientation" MSLQ scale tended, on average, to receive a greater proportion of "monitoring" feedback (*r* = .47, *p* = .003) and "ambition" feedback (*r* = .45, *p* = .006). Students

Table 7

Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types and MSLQ scales

Feedback type	MSLQ scale															
	Overall MSLQ (revised)	Intrinsic goal orientation (revised)	Extrinsic goal orientation	Task value	Control of learning beliefs (revised)	Self-efficacy for learning	Test anxiety	Rehearsal	Elaboration	Organisation	Critical thinking	Metacognitive self-regulation	Time and study environment	Effort regulation	Peer learning	Help seeking
Feedback about the task	-.33	-.14	.02	-.13	-.17	-.09	.31	-.19	-.15	-.11	-.20	-.22	-.25	-.12	-.15	-.03
Feedback about the processing of the task	.00	-.22	-.17	-.11	-.12	-.01	-.10	.05	-.21	.20	-.15	.04	.30	-.06	-.12	-.11
Feedback about the self as a person	.02	-.01	-.11	.16	.21	**.34***	-.08	-.17	-.13	-.21	.19	-.14	.01	-.03	-.15	-.26
Feedback not about SRL	-.31	-.20	-.10	-.05	-.06	.12	.22	-.28	-.29	-.19	-.11	-.29	-.22	-.15	-.28	-.22
Monitoring	**-.39***	**.47****	.11	.26	.31	.25	.11	.07	**.33***	-.03	.28	.23	.24	.21	.17	.11
Reflecting	-.04	-.21	.03	-.16	-.06	-.31	-.20	.17	-.10	.09	-.16	.03	-.03	-.11	.12	.10
Feedback about SRL (Metacognitive)	.24	.08	.12	-.00	.14	-.18	-.15	.27	.13	.12	.01	.22	.14	.02	.30	.22
Ambition	.22	**.45****	-.05	.18	-.03	.24	.00	.01	**.38***	.26	**.35***	.09	.20	.33	-.14	-.11
Effort	.11	-.07	.05	.06	-.12	-.06	**-.46****	.16	.11	-.04	-.08	.30	.14	.12	.22	.23
Feedback about SRL (Self-efficacy)	.25	**.35***	-.03	.15	-.18	.12	-.22	.08	**.46****	.21	.29	.25	.26	**.37***	.01	.05
Feedback about SRL	.31	.20	.10	.05	.06	-.12	-.22	.28	.29	.19	.11	.29	.22	.15	.28	.22

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$**.** Significant correlation values are shown in bold text.

scoring more highly on the “Elaboration” MSLQ scale tended to receive a greater proportion of overall “Feedback about SRL (Self-efficacy)” (r = .46, p = .004). Students reporting high “Test anxiety” MSLQ scores tended to receive less “effort” feedback (r = -.46, p = .005). These above significant moderate correlations are depicted in the scatterplots in Appendix N.

As might have been predicted otherwise, there was only a non-significant, weak correlation between the proportion of “Feedback about SRL” and the revised “Overall MSLQ” measure (r = .31, p = .098). Since the tested constructs within the “Control of learning beliefs (revised)”, “Self-efficacy for learning” and “Effort regulation” MSLQ scales were closely related to, or included within, the definition of self-efficacy used to categorise feedback, it was interesting to only find weak or very weak correlations for these scales with the proportion of “Feedback about SRL (Self-efficacy)” (respectively r = -.18, p = .299; r = .12, p = .493; and r = .37, p = .026) and with “Feedback about SRL” as a whole (respectively r = .06, p = .710; r = -.12, p = .465; and r = .15, p = .381). In fact, the “Self-efficacy for learning” MSLQ scale correlated more strongly with the average proportion of “Feedback about the self as a person” (r = .34, p = .038), a feedback category not related to SRL. Surprisingly, there was no correlation between the “Effort regulation” MSLQ scale and the average proportion of “effort” feedback (r = .12, p = .497) nor between the “Metacognitive self-regulation” MSLQ scale and proportions of “Feedback about SRL (Metacognitive)” (r = .22, p = .197) or “Feedback about SRL” overall (r = .29, p = .091).

These correlation analyses were also conducted separately for individual teachers. Whilst the statistical significance of effects differed for both due to the reduced sample size, the patterns of each correlation between feedback categories and MSLQ scales differed to a greater extent for Bob, compared to Anna. The positive significant correlations described above for the full dataset were similarly present for Anna, but there existed an increased number of moderate strength positive correlations with “monitoring” feedback (e.g. students scoring more highly for the revised “Overall MSLQ” measure tended to receive a greater proportion of “monitoring”

feedback (r = .50, p = .049)) and with "Feedback about SRL" as a whole (e.g. students scoring more highly on the "Elaboration" MSLQ scale tended to receive more overall "Feedback about SRL" (r = .46, p = .036)). With a higher proportion of Anna's feedback being "Feedback about the task" (M = 63.9%), an increased number of moderate negative correlations were found, as expected, between MSLQ scales and the proportion of "Feedback about the task".

Considering Bob's feedback separately, there were far more correlations with magnitude of $r \geq .40$ (44, compared to 15 for Anna and only four for the full sample), with r values as high as .71, potentially suggesting Bob's feedback was more targeted to students' respective SRL abilities or simply a consequence of a far greater number of comments per student compared to Anna's. Of note, because they relate to different constructs within the defined pathways from feedback to SRL, students who scored more highly on the self-reported "Metacognitive self-regulation" MSLQ scale strongly tended, on average, to receive a higher proportion of "effort" feedback (r = .67, p = .005). There were a higher number of moderate positive correlations found between proportions of "effort" feedback and MSLQ scales (e.g. students reporting higher scores on the "Help seeking" MSLQ scale tended to receive a greater proportion of "effort" feedback (r = .53, p = .034)) and, despite a lower proportion of "Feedback about the self as a person" (M = 8.5%), there were many more moderate negative correlations between this feedback type and MSLQ scales (e.g. students again scoring more highly on the "Help seeking" MSLQ scale tended to receive less "Feedback about the self as a person" (r = -.59, p = .016)). Full correlation tables for the individual teachers can be found in Appendix O.

3.6 Properties of teacher-perception SRL measure

A Cronbach's alpha reliability estimate was computed for the overall mean scale measure of teacher-perceived students' SRL, calculated from the teacher survey measures "Metacognitive SR" and "Self-efficacy". For the full sample, comprising scores from all four participant teachers, a coefficient of .920 was calculated, indicating high reliability. For teachers

separately, coefficients were found to be .602 (Anna), .807 (David) .909 (Bob), and .924 (Charles); this potentially suggested teachers were differentiating students according to these two characteristics to different extents, with Anna discriminating to the greatest degree.

Pearson correlations (two-tailed, pairwise) between these three teacher-perception scale measures for the overall sample, revealed that both teacher-perceived "Metacognitive SR" and "Self-efficacy" were very strongly correlated with the overall mean (r = .96, p < .001). However, the "Metacognitive SR" and "Self-efficacy" teacher-perception scales were also very strongly correlated with each other (r = .85, p < .001), despite these scales relating to separately defined constructs within the wider SRL; as can be seen from Tables P2-P5 (see Appendix P), r values ranged from .44 (Anna) to .86 (Charles). This implies low validity for these scales as teachers, though to different extents, did not consistently distinguish between these constructs when evaluating their students' abilities.

3.7 Relationships between teacher feedback and teacher-perceived SRL ability

To examine whether there were any relationships between the proportions of different feedback types and the teachers' perceptions of their students' SRL abilities (according to the teacher survey measure), i.e. Research question 3, scatterplots were again scrutinised for linear relationships and Pearson correlations (two-tailed, pairwise) were calculated. Table 8 shows correlations between the overall average proportions of different feedback types with teacher-perceived scale measures of students' "Metacognitive SR", "Self-efficacy" and "Overall mean SRL". A number of significant correlations existed, with the magnitude of r values ranging from .33 to .64, and, interestingly, r values were similar for the correlations of feedback type with both teacher-perception of metacognitive self-regulation and self-efficacy.

If teacher understanding of "Metacognitive SR" and "Self-efficacy" (as outlined to them on the survey) is in line with these constructs within the feedback model, correlations might be expected between the teacher survey measures and the proportions of the respective feedback

Table 8

Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types and teacher-perceived SRL scales

Feedback type	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Feedback about the task	.21	.19	.21
Feedback about the processing of the task	-.02	-.13	-.08
Feedback about the self as a person	**.41***	**.33***	**.39***
Feedback not about SRL	**.46****	**.36***	**.43****
Monitoring	.27	**.40***	**.35***
Reflecting	**-.61*****	**-.61*****	**-.64*****
Feedback about SRL (Metacognitive)	**-.54*****	**-.45****	**-.52****
Ambition	**.43****	**.40***	**.43****
Effort	**-.49****	**-.44****	**-.48****
Feedback about SRL (Self-efficacy)	.12	.14	.14
Feedback about SRL	**-.46****	**-.36***	**-.43****

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

type, though direction cannot necessarily be predicted due to lack of knowledge about teachers' individual beliefs about feedback provision, i.e. to support weaker SRL abilities or target stronger SRL abilities. Overall, teachers tended to provide students they ranked more highly on their "Metacognitive SR" scale with less "reflecting" feedback ($r = -.61$, $p < .001$) and less "Feedback about SRL (Metacognitive)" ($r = -.54$, $p < .001$). Teachers tended to provide students who scored more highly on the two individual scales and on the overall mean teacher-perceived SRL scale with a lower proportion of overall "Feedback about SRL" ($r = -.43$, $p = .009$). In contrast, there was only a non-significant, very weak positive correlation between the teacher-perceived measure of "Self-efficacy" and the proportion of "Feedback about SRL (Self-efficacy)" ($r = .14$,

p = .403), though a stronger, significant negative correlation with "Feedback about SRL" as a whole (*r* = -.36, *p* = .029), i.e. teachers tended to provide students they ranked more highly on their "Self-efficacy" scale with less "Feedback about SRL". These above significant moderate correlations are depicted in the scatterplots in Appendix Q.

In addition to differences in the statistical significance of effects differed for both due to the reduced sample size, correlation analyses for the individual teachers, Anna and Bob, revealed some differences in patterns and the comparative dominance of aspects, "Metacognitive SR" versus "Self-efficacy", in relation to their feedback practices. Considering her practice separately, as found for the overall sample, Anna tended to provide students she ranked more highly in "Metacognitive SR" with less "Feedback about SRL (Metacognitive)" (*r* = -.51, *p* = .019). However, in contrast to the full sample, there was no significant correlation between Anna's measure of "Metacognitive SR" and the proportion of "Feedback about SRL (Self-efficacy)" (*r* = -.03, *p* = .883), i.e. between separate constructs. This was not observed in Bob's practice, with the correlation between his measure of "Metacognitive SR" and the proportion of "Feedback about SRL (Metacognitive)" being only very weak and non-significant (*r* = -.17, *p* = .526), compared to a stronger correlation between "Metacognitive SR" and the proportion of "Feedback about SRL (Self-efficacy)" (*r* = -.38, *p* = .152). Furthermore, this latter correlation was stronger than the correlation between his measure of "Self-efficacy" and proportion of "Feedback about SLR (Self-efficacy)" (*r* = -.07, *p* = .785), i.e. between equivalent constructs. For Bob's feedback, the strongest correlations (*r* values .50 to .63) were found between the three teacher-perception SRL scales and his proportion of "Feedback about the self as a person", within the "Feedback not about SRL" category.

In both the full sample and within Anna's practice, though non-significant and very weak, correlations between the proportion of "Feedback about SRL (Self-efficacy)" and the three teacher-perception SRL scales were positive (*r* values .12 to .14 for the full sample, .09 to .14 for Anna's subsample); in Bob's case these correlations were all negative (*r* values -.07 to -.26). The

proportion of Anna's "effort" feedback was weakly positively correlated with all three teacher-perception SRL scales (*r* values .23 to .36), which was in contrast to both the full sample and Bob's feedback considered separately, which all showed negative correlations (*r* values -.44 to -.49 for the full sample, -.34 to -.44 for Bob's subsample).

Whilst the strength of the correlations in both cases was weaker, Anna's proportion of "Feedback about SRL" overall was considerably more strongly negatively correlated with her perception of students' "Metacognitive SR" (r = -.39, p = .085) than with her mean overall teacher-perceived measure of SRL (r = -.20, p = .392), with no correlation evident with her measure of students' "Self-efficacy" (r = .01, p = .974). In contrast for Bob, the strongest negative correlation with "Feedback about SRL" overall was with his measure of 'Self-efficacy' (r = -.36, p = .176). Full correlation tables for the individual teachers can be found in Appendix R.

As a final point, evaluating values in Tables 7 and 8, for the full sample, there were generally stronger correlations between the types of feedback given and teachers' perceptions of students' SRL abilities, than between the types of feedback and students' overall MSLQ scores; this is as would reasonably be expected as it is teacher judgment that determines the feedback they give. However, in a large number of cases, the direction of the correlations were opposite; for example, students who received a higher proportion overall of "Feedback about SRL", tended to score lower on the teacher SRL scale (r = -.43, p = .009), but tended to self-report higher overall scores on the MSLQ (r = .31, p = .098). Notable exceptions to this included the correlation between "Feedback about SRL (Self-efficacy)" and student "Intrinsic goal orientation" (r = .35, p = .036) which was higher than with this type of feedback and the teacher measure of "Self-efficacy" (r = .14, p = .403). Similarly, the correlation between "Feedback about SRL (Self-efficacy)" and student "Effort regulation" (r = .37, p = .026) was higher than with this type of feedback and the teacher measure of "Self-efficacy" (r = .14, p = .403). Additionally, there was scarce similarity between the overall pattern of correlation strengths and directions when comparing teacher and student perceptions of "Metacognitive SR". This was exemplified

in that students rating higher by their teachers for "Metacognitive SR" tended to receive more "Feedback not about SRL" (r = .46, p = .005), less "Feedback about SRL (Metacognitive)" (r = -.54, p < .001) and less overall "Feedback about SRL" (r = -.46, p = .005), whilst students reporting higher scores for "Metacognitive SR" on the MSLQ tended to receive less "Feedback not about SRL" (r = -.29, p = .091), less "Feedback about SRL (Metacognitive)" (r = .22, p = .197) and less overall "Feedback about SRL" (r = .29, p = .091). The same trends for the correlations described above were seen in the subsamples for the two teachers.

3.8 Relationships between teacher and student perceptions of SRL ability

Table 9 shows the Pearson correlations (one-tailed, pairwise) between teacher-perceived scale measures of students' metacognitive SR, self-efficacy and overall SRL ability (according to the teacher survey administered) and student self-reported MSLQ scales, conducted alongside scrutinising scatterplots for linear correlations; this analysis aimed to address Research Question 4, namely whether there existed any relationships between the separate measures of teacher and of student perceptions of SRL abilities. Overall, there were only a fraction of correlations which were significant to any degree, and only four correlations were deemed to be moderate in strength, i.e. .40 ≤ r < .60. Students ranking more highly on each of the three teacher-perception SRL scales tended to report higher scores on the revised "Intrinsic goal orientation" MSLQ scale, with the strongest correlation being with the "Self-efficacy" teacher-perception scale (r = .43, p < .001). Similarly, students ranking more highly on each of the three teacher-perception SRL scales tended to report higher scores on the revised "Self-efficacy for learning" MSLQ scale; again, the strongest correlation was found with the "Self-efficacy" teacher-perception scale (r = .44, p < .001), as might be expected. Scatterplots for these two key correlations can be found in Appendix S. Only weak positive correlations were found between the teacher-perception SRL scales and the "Effort regulation" MSLQ scale (r values .24 to .26) and between the "Control of learning beliefs (revised)" MSLQ scale (r values

Table 9

Pearson correlations (one-tailed, pairwise) between teacher-perception SRL scales and MSLQ scales

MSLQ scale	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Overall MSLQ (Revised)	.14	.12	.14
Intrinsic goal orientation (Revised)	**.38*****	**.43*****	**.42*****
Extrinsic goal orientation	-.17	-.15	-.16
Task value	.14	.14	.15
Control of learning beliefs (Revised)	**.20***	**.23***	**.22***
Self-efficacy for learning	**.35****	**.44*****	**.41*****
Test anxiety	-.14	-.13	-.14
Rehearsal	**-.23***	-.18	**-.21***
Elaboration	.09	.10	.10
Organisation	.09	.02	.06
Critical thinking	.16	.09	.13
Metacognitive self-regulation	.01	-.02	-.00
Time and study environment	.14	.19	.17
Effort regulation	**.24***	**.25***	**.26***
Peer learning	**-.19***	**-.19***	**-.20***
Help seeking	**-.20***	**-.25***	**-.24***

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

.20 to .23), despite being closely aligned with the definition of "Self-efficacy" provided to teachers. Considering other significant correlations of interest, students ranked more highly on each of the three teacher-perception SRL scales tended to score themselves less highly for the use of "Peer learning" (*r* values -.19 to -.20) and "Help seeking" strategies (*r* = -.20 to -.25). Finally, there was only a very weak and non-significant positive correlation between the overall

mean of the teacher-perceived SRL measure and the “Overall MSLQ (revised)” score (r = .14, p = .149). Surprisingly, there was no evidence of any significant correlation between the “Metacognitive self-regulation” MSLQ scale and any of the teacher-perception scales, including the teacher-perception “Metacognitive SR” scale (r = .01, p = .454).

Considering subsamples of students by teacher separately, there were no consistent patterns in correlation strength or direction; full correlation tables for each of Anna, Bob, Charles and David can be found in Appendix T. For example, the correlations between the teacher and student scores for “Metacognitive SR” ranged from weak, negative correlation (r = -.33, p = .103 (Bob)) to moderate positive correlation (r = .42, p = .041 (David)). This wide variation in correlations strength and direction for each teacher could be cancelling each other out overall, in this case leading to the apparent lack of correlation; this effect may exist for other SRL capabilities.

4. Discussion

4.1 Overview

This section aims to provide valuable discussion of the results reported previously, with reference to relevant and contextualising feedback and self-regulated learning (SRL) literature. It also evaluates the limitations of the research and makes suggestions for interesting areas of future work, where appropriate.

4.2 Nature of teacher feedback

In addressing this study's first research question, the results were in line with other research findings (Arts et al., 2016; Derham et al., 2021; Dirkx et al., 2021) that teacher feedback predominantly relates to the task, despite this level of feedback being reported to be powerful in only more limited circumstances, namely when the task information can be used to improve future strategising, when about faulty interpretations, or when undiluted by feedback at the self level (Hattie & Timperley, 2007). Feedback relating to the processes underlying the task was observed far less frequently in this study than reported elsewhere (Arts et al., 2016; Dirkx et al., 2021), despite this category being believed to more effective than the task level for enhancing deeper learning (Hattie & Timperley, 2007). This may be a consequence of discrepancies in the coding of this type of feedback, it potentially being conflated with task-related feedback, with Lipsch-Wijnen and Dirkx (2022) identifying that task- and process-related utterances are commonly found in combination with one another. More likely, process feedback in this study may have been categorised more meaningfully within the defined subdomains of SRL related to the metacognitive processes inherent in the completion of a task, i.e. monitoring or reflecting. Arts et al. (2016) attribute this difficulty in unanimously distinguishing process-related feedback from SRL feedback, or its subcategories, in part to the adoption of the term ”strategy” in the respective category descriptions: Hattie and Timperley (2007) employ “strategy” in reference to process-related feedback; others, including Nichol and Macfarlane-Dick (2006) and Butler and

Winne (1995) employ it in the context of self-regulation.

A direct comparison of the proportions of feedback relating to SRL overall and feedback aimed at the self, or person, level in this case with other studies might not be entirely appropriate, due to the modification of the feedback model employed here. Nevertheless, the proportion of feedback about SRL was found to be in keeping with other studies (Arts et al., 2016; Dirkx et al., 2021). However, despite aspects of personal feedback related to student self-efficacy being subsumed within a wider definition of SRL here, and this level of feedback being widely explained to have little effect on learning gains (Hattie and Timperley, 2007), the results indicate a considerable, though not unsurprising, tendency of teachers to provide feedback of this type to students in this educational setting. Such comments may be more valuable to the development of strong teacher-student relationships, than to improved learning (Wiliam, 2011).

When the teachers gave feedback about SRL, the type of comments given were more often related, at a broad level, to the metacognitive than the self-efficacy pathway. However, digging deeper within the metacognitive feedback, the two teachers differed in the extent to which they commented on monitoring or reflecting. This was also true for the kind of self-efficacy feedback given; the teachers differed in the extent to which they commented on ambition or effort. Neither planning nor persistence related comments were observed in any number and were excluded from further investigation.

Whilst a number of reviews have sought to distil and articulate the properties of good feedback practices, including within the context of SRL theory (Nicol and Macfarlane-Dick, 2006), a definition of “good feedback” within educational practice is subjective, context-dependent and not something this study aimed to identify; participant teachers were not selected for any exemplary nature of their feedback. Lipsch-Wijnen and Dirkx (2022) probably rightly conclude that there may exist no “universal mix” (p. 13) with regard to the level of feedback provided, rather that any optimal mix does and, importantly, should, depend on the teacher’s goals for this feedback. If an ambition of teacher feedback in this context is to promote or support

student SRL, and transition towards a “new paradigm of feedback” (Carless, 2015), it can logically be inferred that a greater proportion of SRL feedback would be advantageous in this regard. Although there was a large gap between the absolute number of feedback comments provided by the two teachers sampled in this small case study, a reasonably stable and considerable proportion of total feedback related to SRL, via a balance of both metacognitive and self-efficacy pathways, which suggests that teachers, intentionally or otherwise, provided feedback targeting students’ SRL.

A number of moderate correlations were observed between the different types of feedback, with correlations between subcategories and their umbrella categories (e.g. “Feedback about the task” and “Feedback not about SRL”) tending to be in line with their respective proportions of the total feedback. Significantly more variation in such expected patterns was found, however, for correlations between individual pathways, e.g. reflecting, with other variables both within the same, and across different, constructs, i.e. metacognitive and self-efficacy. For example, findings seem to indicate that if a student, or rather their work, receives task-related feedback, they are less likely to receive SRL feedback. However, this research cannot conclude whether this is a product of the individual student response or a specific tendency on the part of the teacher. One reasonable hypothesis is that the burden of teacher marking requires a finite amount of time and/or effort to supply feedback to each student, therefore if a piece of work necessitates the provision of high proportions of task-related feedback, for example as corrections, teachers may offer less SRL feedback, irrespective of any personally-held beliefs about the relative effectiveness of each type.

A number of correlations existed in opposing directions for the different teachers, for example that between the proportions of reflecting feedback and effort feedback. Such an example of discrepancy between teacher practices could again be more reasonably indicative of varying approaches to types of feedback, rather than necessarily opposing pedagogic beliefs. By way of illustration, a superficial scrutiny of examples of effort-related feedback identified that

although both teachers' feedback was invariably positive, rather than offer criticism of lack of effort, they differed in how explicitly they focussed on the quality of effort. Specifically, Anna's comments tended to be more stand-alone, for example "Excellent effort in this explanation, […], as always", whereas in contrast, Bob's comments, most frequently "Well tried", were commonly found as the starting point to the end-of-text feedback, and consequently less impactful. Future work, however, could still benefit from including categorisation of feedback as positive or negative, praise or criticism. Kluger and DeNisi (1996) claim that both positive and negative feedback can lead to beneficial effects on learning, as both have the power to both augment or attenuate the effects of the feedback, depending on where it points the student's attention, i.e. metacognitive processes, task motivation or task learning. This is a more complex picture than praise universally acting as an "external regulator" and criticism a "de-regulator" for SRL (de la Fuente-Arias, 2017).

For the full sample, there existed a moderate negative correlation between the proportions of monitoring and reflecting feedback types, for which several explanations may be proffered. The first is that an individual student that tends to receive more monitoring feedback, will receive less reflecting feedback. Secondly, differences in teacher approaches to these closely-related categories, i.e. a teacher consistently favouring one type over the other, potentially explains the observed pattern more defensibly. Additionally, different types of in-text feedback comments have been shown to exhibit variations in linguistic features related to cognitive impact (Derham et al., 2021), such as interrogatives or questions. Within the context of this study, nuanced preferences for certain dialogic style, phrasing or punctuation, would see similar metacognitive-related feedback utterances coded opposingly: e.g. "Be careful mixing your tenses" (Anna, monitoring feedback) versus "Do you think about your tenses?" (Bob, reflecting feedback). Whilst Bose and Rengel (2009) contend that "self-reflection is the heart of self-regulation" (p. 32), Clark (2012) highlights that the interrelatedness of the processes imposes considerable challenge upon determining whether monitoring or reflecting represents

the true “pivot” or “heart” of SRL (p. 241), a challenge echoed in decision making during the feedback coding process.

From a theoretical perspective, this study also sought to evaluate whether the feedback model employed was an effective and/or useful one. Overall, the model appeared to reflect teacher practice to a considerable extent, with the exception that few comments were categorised as relating to planning or persistence. The practice of a larger sample of teachers would need to be analysed in order to reliably conclude whether the low occurrence of these types of feedback is specific to these two teachers or a more common observation; the latter would suggest that these categories may be redundant within the feedback model. It could be, for example, that teachers more frequently provide these types of feedback verbally during lessons and, as such, instances are not captured by this research.

As was expected, based on the experience of previous studies (e.g. Arts et al., 2016), there were notable difficulties in categorising teacher comments according to the feedback model (more so for Anna’s feedback). Multiple rounds of training, classification and discussion were required to achieve an appropriate level of interrater agreement on a 10% random sample of comments, before the author was able to code the remaining comments independently. Lipsch-Wijnen and Dirkx (2022) further stress that there may exist significant differences between the intention of the teachers’ feedback (to which this study had no access) and the interpretation of the feedback, both by the student and impartial observer. Follow-up interviews with teachers, to clarify the motivation behind any feedback comments that proved contentious between raters, could be an improvement to similar research studies in future.

Other coding frameworks might allow teacher feedback to be evaluated without access to teacher intentions and motivations, by focussing more on content of feedback, rather than its aim, such as Glover and Brown’s (2006) three categories (indications; corrections; indications or corrections with an explanation), Guasch Canals et al.’s (2013) typology (clarification; affirmation/negotiation; argumentation; personal opinions; correction; question; suggestion) or

Guo's (2017) five types (verification; directive; scaffolding; praise; criticism). However, these would not explicate metacognitive and self-efficacy routes to SRL of Clark's (2012) model in the same way, which was an aspect of specific interest to this study. Future research may beneficially, instead, look to break down only certain levels of feedback further, such as to define: positive versus negative feedback; corrective/directive comments, evaluative comments and edits (c.f. Derham et al., 2021); or surface (e.g. spelling) versus deeper (e.g. organisation) features of task-related feedback (c.f. Biggs & Collis, 1982).

4.3 Relationships between teacher feedback and student-perceived SRL ability

A version of the widely-employed Motivated Strategies for Learning questionnaire (MSLQ) (Pintrich et al., 1991), adapted and piloted to accommodate the age, students' linguistic abilities, subject and educational context, was utilised in this study to address the second research question. Whilst comprehensive validation of the revised instrument was beyond the scope of this study, the scale measures all appeared to function well, with individual scale Cronbach's alpha reliability estimates generally being in line with those reported in the manual. It is not possible to determine whether student responses were influenced by a reported tendency of males towards exaggeration of their attributes (e.g. Pintrich and Zusho, 2007). However, a high overall Cronbach's alpha reliability coefficient suggested that their self-reports were at least consistent, if not an entirely accurate representation of reality, indicating the students' age and cognitive ability was indeed sufficient to effectively evaluate their SRL abilities. However, this cross-sectional survey was only administered at one point in time, and therefore only captured a snapshot of student perceptions. These would likely fluctuate, based on any number of factors, potentially arguing a case for repeating the MSLQ survey multiple times over the course of the research period, for averages of scale scores to be calculated and used in analysis, for improved reliability.

Correlational analysis conducted in this study found, overall, only a small number of

moderate correlations between types of feedback and student SRL scale scores. These were fewer in number than might have been reasonably predicted, and generally not between variables expected to be construct-related based on scale descriptors (e.g. “effort” feedback and the “Effort regulation” MSLQ scale). For example, students who self-reporting higher intrinsic goal orientation tended to receive a greater proportion of both monitoring and ambition feedback types and students self-reporting stronger skills of elaboration, a metacognitive process, tended to receive a greater proportion of overall SRL feedback related to self-efficacy. The strength and direction of observed correlations again varied between the two teachers. Regardless, it is conceivable in this case that stronger or more numerous correlations indicate conscious targeting of students’ SRL on the part of teachers. The participant teachers in this study, however, had received no specific training in providing SRL-related feedback; as such, it could be argued that decent correlations should not have been a prior expectation. This leads to the proposition that this type of feedback analysis could be beneficial at an individual teacher’s professional development level in helping to identify the extent to which their feedback might target aspects of SRL and to suggest areas for improvement, ideally with training. Given the effort and time-burden associated with providing feedback, teachers would be advised to consider carefully the aim of their feedback, such as promoting a specific aspect of SRL, and adapt it to target this. In addition to their own judgements, if teachers are in possession of knowledge about their students’ perceptions of their SRL abilities via a measure such as the MSLQ, this would allow more targeted and individualised differentiation of feedback, likely increasing the effectiveness of the feedback and students’ perceptions of its usefulness.

There may be a number of possible explanations for the observation of fewer, weaker correlations than expected; this research was unable to offer specific confirmation of which. Aforementioned reasons, including the lack of information collected about the positive versus negative nature of certain feedback types, or the limitations of the small sample size, cannot be discounted. However, there is something intrinsic to the activity of correlating variables at the

level of the person and the work that probably limits the likelihood of significant correlations being observed. The MSLQ scales each attempt to measure a general attribute of individual students, whereas the analysed feedback captures only a small number of specific instances of student behaviour. Even if a larger sample of student work was collected, the feedback would not likely reflect the person as a whole, as the nature of the feedback is invariably triggered by the individual response. Whilst a teacher may have the intention to target their feedback towards a student's perceived SRL competencies, the piece of work being marked may not present the teacher with appropriate opportunities to do so, or other feedback types may be deemed to be more immediately required.

Alternatively, there could be issues regarding the translation or enaction of teacher feedback into meaningful and observable changes in student perceptions, or indeed into learning gains. Such issues may arise from students not being given sufficient time or encouragement to read and process feedback; expert focus group interviews (Lipsch-Wijnen & Dirkx, 2022) recommend opportunities for students to actively engage with feedback, such as through the completion of feedback portfolios. For example, Brown et al. (2016) found that students who report to actively take up teacher feedback report to more frequently employing SRL strategies. Students may not be able to, or choose not to, read feedback comments, may not understand what the teacher means, or may not trust the feedback. One might readily conclude that such factors would lead to weaker associations between proportions of feedback types and students' perceptions of SRL abilities. However, based on their finding that not trusting teacher feedback is correlated with stronger academic performance, Brown et al. (2016) propose that such reasons to pay more attention to feedback may lead to deeper-level cognitive processing of its content and intention, and greater subsequent improvement in performance; a similar trend may exist in relation to student self-regulation. Furthermore, not all feedback comments demonstrate the same potential to promote student engagement and action; for example, not all coded utterances related to reflecting have equal value in this regard. Nystrand

(1997) argues that, though questions offer opportunities to promote internal dialogue, these are less meaningful if presented as interrogatives, e.g. 'Why?', if task- rather than process-related, or indeed just as annotations, e.g. '?'.

This study cannot elucidate the extent to which teacher feedback formulates students' perceptions of their abilities or to which students' perceptions are reflected in the reality that it impacts upon their work and consequently triggers particular feedback; of course, it is likely to be a combination. Whilst the act of teachers giving feedback, both positive and negative in focus, may be creating this sense of self in the students, Kulhavy (1977) demonstrates that feedback is not universally a reinforcer, as students have the capacity to accept, reject, or even modify the feedback. It could be further argued that this tendency may itself be dependent on factors such metacognitive ability or self-efficacy. Moreover, whilst it is expected that teacher feedback plays a key component in the development of students' perceptions, it is unlikely to be the sole influence, with students taking influence from other sources, such as their peers, parents, or teachers of other subjects. As a result, it may be unwise to expect especially strong correlations between the nature of teacher feedback and students' perceptions of their SRL capabilities.

The findings suggest a degree of construct overlap, such as the observed significant correlation between students' use of elaboration, a metacognitive strategy, and the proportion of ambition feedback received, an aspect of self-efficacy. This suggests that the internal pathways from feedback to SRL may not be as linear or clearly demarcated (metacognitive versus self-efficacy routes) as Clark's (2012) model implies, perhaps instead mirroring the greater complexity and variety of teacher feedback's positioning within SRL, as captured by some other frameworks (e.g. Winne & Hadwin, 1998). It would be instructive for future studies to investigate how individual students respond to and internalise the feedback, perhaps by means of written reflection tasks or follow-up think-aloud interviews. These were originally designed into this research study's methodology but were removed following concerns from the

school gatekeeper regarding burden on teachers and impact on teaching time.

4.4 Relationships between teacher feedback and teacher-perceived SRL ability

From the teacher survey, strong correlations between teachers' ratings of students' metacognitive self-regulation and self-efficacy, as well as similar strengths of correlation between these two scores and the types of feedback employed, suggested that teachers were not differentiating between these two pathways; this potentially lowers the validity of these scales. This could be explained by teachers not paying due attention to the descriptors for "Metacognitive SR" and "Self-efficacy" given in the survey, teachers not having sufficient knowledge about these constructs to be able to identify them within their students, or teachers requiring specific training to develop their feedback approaches with SRL in mind. Alternatively, it could be argued that it is not relevant for the purposes of providing feedback for teachers to have accurate, and distinct, perceptions of their students' metacognitive SR and self-efficacy. If a desired purpose of feedback is to promote SRL, however, this raises the question of what is driving teachers' feedback practices.

Speaking to Research Question 3, teachers tended to provide students they scored more highly on the two individual scales and on the overall mean teacher-perceived SRL scale with less reflecting-related feedback, less metacognitive SRL feedback and less overall SRL feedback. However, this study established that correlation strengths and directions were not particularly consistent across the two teachers, suggesting low generalisability of the findings. For example, this was exemplified by opposing correlations between the proportion of effort feedback and the teacher's perception of students' self-efficacy. For Anna, students she rated highly in terms of self-efficacy tended to receive more effort feedback; for Bob, students he perceived to have high self-efficacy tended to receive less.

However, the conclusion that feedback patterns are quite individualised, whilst perhaps unsurprising, seems reasonable and legitimate. In the absence of any school-mandated

requirements for the style and content of written feedback, as in this case, teachers are likely to demonstrate different approaches based on numerous factors, including their pedagogic beliefs and motivations, their level of training and experience, and the demographics of the students they teach. It would be informative for future research, with a larger and more representative sample of participant teachers, to establish if there exist any significant trends, for example whether feedback composition varies with student age of cognitive ability. Furthermore, a longitudinal study over a longer period of time would enable researchers to establish whether such trends generalise over time, indicating stable preferences in teachers' feedback style, and less a product of individual responses or cohort of students. Additionally, such a study could analyse how teacher feedback and perceptions of SRL change, as both students' progress and assignment demand increases, potentially adding to the limited body of literature on the impact of feedback upon SRL.

Analysing the results related to Research Questions 2 and 3 together, it is evident that the nature of feedback given is more closely associated with teachers' perceptions of their students' SRL abilities than students' own perceptions; this is as might reasonably be expected. However, the directions of correlations would likely depend on a number of factors, including teachers' beliefs about the impacts of what they say on students' learning or behaviour. Some may reason that it is more important to provide feedback aimed at supporting aspects of SRL that their students are weaker at; others may focus their feedback to target their students' SRL strengths. In order to better understand teacher beliefs and motivations, future work might look to incorporate structured interviews with teachers to mediate a process of reflection on patterns found within their feedback practices.

4.5 Relationships between teacher and student perceptions of SRL ability

In relation to Research Question 4, significant moderate correlations found included that, overall, students ranking more highly on each of the three teacher-perception SRL scales

tended to report higher scores on the revised MSLQ scales for intrinsic goal orientation and self-efficacy for learning. Of course, these SRL attributes were not measured on the same scales, however, potentially limiting the accuracy of conclusions drawn. In other cases, a wide variation in correlation strength and direction between the four teachers may have led to a cancelling out effect, such as the apparent lack of correlation for the full sample between teachers' and students' perceptions of metacognitive self-regulation. Larger, more representative samples would therefore be required in order to draw more statistically generalisable conclusions, or to more reliably confirm that these correlations are individualised to different teachers and their student cohorts.

As referenced in the previous section, strong correlations were found between teachers' ratings of students' metacognitive self-regulation and self-efficacy, as well as similar strengths of correlation between these two teacher scales with feedback type, and between these teacher scales and students' MSLQ scale scores. Whilst this study has proposed explanations including teachers not paying due attention to the construct descriptors given in the survey or not having sufficient knowledge or training regarding SRL, it was evident that teachers exhibit different levels of understanding of their students in the varying metacognitive and self-efficacy aspects of SRL. Ideally, for a teacher closely in tune with their students' perceptions of themselves and their SRL capabilities, this analysis would reveal strong, positive correlations between teacher and student scale variables relating to equivalent constructs such as self-efficacy, as well as between variables relating to metacognitive self-regulation and strategies such as rehearsal.

Teachers seem to have a more consistent feel for how students perceive themselves in terms of self-efficacy, which is a more tangible construct for teachers to observe manifesting in their students. Though it is possible that students simply have unreasonable expectations or perceptions of their metacognitive abilities, a more reasonable conclusion is that teachers have a weaker understanding either of what metacognition means, or their students' strengths in this area. Metacognition is by its nature an internal process, and difficult for teachers to observe,

even in a live classroom setting. When marking written work, teachers can only infer from the output whether a student likely demonstrated SRL processes or capabilities. Given that teachers tend to provide a larger proportion of metacognitive self-regulation feedback than self-efficacy feedback, such analysis would be beneficial for all teachers to engage with, primarily to initiate insightful learning conversations with their students that would help teachers to understand the internal mental processes their students typically go through, and ultimately to better match their perceptions to reality, allowing this type of feedback to have greater effect on student learning and behaviour.

A direction for future work might include statistical path analysis to establish whether feedback, or specifically the proportion of feedback related to SRL, moderates the relationship between teacher and student perceptions of SRL skills. This would provide valuable insight into whether the observed relationships between variables are explained by a predicted causal relationship, i.e. that teacher perception of student SRL influences the feedback provided, which in turn impacts upon student beliefs of their own SRL abilities.

5. Conclusion

This study aimed to gain a better understanding of the nature of teacher-written feedback given to 11-13 year-old students in UK secondary education in the subject of English. As far as is known, this is the first study to utilise a feedback framework based on Hattie and Timperley's (2007) and Clark's (2012) models, in conjunction with an adapted version of the Motivated Strategies for Learning questionnaire (Pintrich et al., 1991) to explore relationships between teacher feedback and student perceptions of self-regulated learning (SRL) ability. Furthermore, and uniquely, this research devised a survey instrument to capture teachers' perceptions of student SRL, believed to be an important driving factor in the determination of feedback provision.

Findings showed that teachers' written feedback was predominantly about the task, as observed elsewhere in the literature. Proportions of feedback about the self as a person were generally in line with other studies, however smaller proportions of feedback about the processing of the task were found, perhaps as a result of the secondary education context, compared to the higher education setting of the majority of studies. Relationships were found between the types of feedback given and both students' perceptions of their own SRL abilities and teachers' perceptions of their students' SRL abilities.

Teachers tended to provide reasonably consistent proportions of feedback about SRL (between one fifth and one quarter), suggesting attempts to promote SRL in students, whether deliberate or otherwise. Of the feedback that targeted SRL, this considerably favoured metacognitive pathways to SRL over self-efficacy pathways, but there were notable differences between participant teachers in the contribution of individual monitoring, reflecting, ambition and effort pathways. However, findings from various correlational analyses indicated that the feedback-promoted internal pathways towards SRL may not be as neatly demarcated (metacognitive versus self-efficacy) as the utilised feedback framework implies.

Teachers were commonly found not to be strongly differentiating between conceptualisations of student metacognitive self-regulation and self-efficacy when rating their students, calling into question the extent to which they have SRL in mind when providing feedback. Overall, teachers seemed to have a more consistent and accurate feel for their students' self-efficacy, as a more tangible quality, compared to metacognitive self-regulation. The nature of teacher feedback was shown to be more closely associated with teachers' perceptions of student SRL ability, than students' own perceptions. Further work could look to investigate this discrepancy, to identify whose perceptions are inaccurate. If it is teachers', this may impose limits on how effectively they can target students' SRL with their feedback. Beyond this, the current study concludes that there is a need for teachers to devote time to learning about their students' aptitudes for SRL and suggests that this time investment can be recovered through the feedback process. Providing a greater proportion of SRL-related feedback, that is constructively aligned with promoting individual students' SRL, may result in less feedback being needed overall to encourage similar, or better, learning gains.

Whilst the small sample size of teachers and highly standardised population impose limits on the statistical generalisability of the findings, it is hoped that the results provide valuable insight into feedback practices for in-service teachers, school management and teacher-training providers. Whilst the findings do not point them to a straightforward solution to the "What works?" conundrum, they clearly suggest that teacher feedback practices are individualised. With some further refinement of the coding framework to ease classification and improve interrater reliability, the feedback model employed in this study appears to be a useful one that can be operationalised either standalone or in combination with instruments to measure student SRL. Crucially, this would guide practitioners in understanding their current practice, how feedback could be more effectively tailored to optimise pathways towards improved student SRL and how teacher professional knowledge could be further enhanced and developed to facilitate this.

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Appendix A

Standardised cognitive ability measure

Cognitive ability was measured by collecting age-standardised, computer-based cognitive abilities test scores for all student participants in this study, administered as part of the school's regular programme of student performance monitoring. In its current (fourth) edition, produced for commercial use by GL Assessments, the CAT4 assessment exists as different levels (A-G) to target ages 7-17+ and comprises four curriculum-independent test batteries in the broad cognitive abilities believed to contribute significantly to learning and achievement: verbal, non-verbal, quantitative and spatial reasoning (GL Assessment, 2021).

At the time of data collection, only Level D data was available for all students: Year 7 students completed this in December 2021 and January 2022; current Year 8 students completed this in June 2021, i.e. the summer of Year 7 (data was therefore not available for two students new to the school). Level D is recommended for Year 7 students (in England) and the standardised norms cover an age range of 10.5 to 13.0 years All Level D battery scales had high internal reliability, with Cronbach's alpha values of ≥.86, The overall mean score reported in this study had Cronbach's alpha of .96 (GL Assessment, 2021).

The overall standardised scores, found as a mean average of the four test batteries, were collected. Standardised scores are computed from students' raw scores, adjusted for age and compared to a nationally representative sample of students of the same age in the UK. The resultant scale places the average score at 100; the maximum score is 141. For further information regarding the CAT4 technical details, psychometric properties and score standardisation process, see the Technical Report (GL Assessment, 2021).

Appendix B

Descriptive statistics for feedback comments and pieces of work sampled, overall and for individual teachers

Variable	Full sample (*N* = 37)				Anna's subsample (*N* = 21)				Bob's subsample (*N* = 16)			
	Min	**Max**	***M***	***SD***	**Min**	**Max**	***M***	***SD***	**Min**	**Max**	***M***	***SD***
Total comments per student	19	155	64.54	43.38	19	53	32.10	7.69	52	155	107.13	32.09
Number of pieces per student	5	9	7.65	1.14	5	9	7.90	1.14	5	8	7.31	1.08
Average comments per piece	2.89	21.86	8.58	5.72	2.89	5.89	4.06	.76	10.38	21.86	14.51	3.41

Appendix C

Adapted Motivated Strategies for Learning questionnaire (MSLQ)

University of Oxford
Department of Education
www.education.ox.ac.uk

[redacted]
MSc in Educational Assessment student
E-Mail: [redacted]



This questionnaire asks you about your study habits, your learning skills and your motivation for work in the subject of English.

This questionnaire comprises two parts: Part I. Motivation and Part II. Learning Strategies. There are a total of 81 questions. It should take approximately 15-20 minutes to complete.

Please complete all of your answers in pencil or erasable pen and make sure that each final answer is clear (i.e. rub out any incorrect or unwanted markings).

Your teachers will not see your individual responses to these questions, so please feel free to be as honest as possible. Try to give a response to every question; avoid leaving any blank.

Once you have completed all of the questions, please submit your named questionnaire to the researcher. Your collected responses will then be pseudoanonymised (any personal information that could visibly identify you will be removed; only the researcher will be able to identify the participant via the use of an encryption key).

Thank you for your contribution to this research study.

[redacted]

Participant name: _____

Today's date: _____

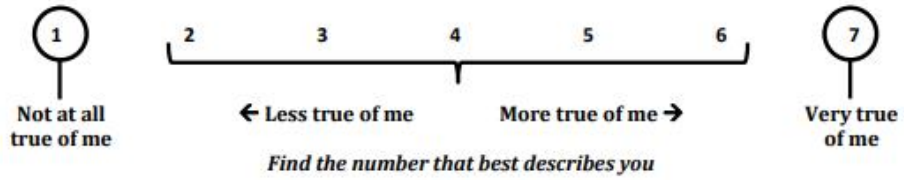
PART I. MOTIVATION

The following questions ask about your **motivation for and attitudes about** the subject of English.

Remember, there are no right or wrong answers; this is not a test. Just answer as accurately as possible.

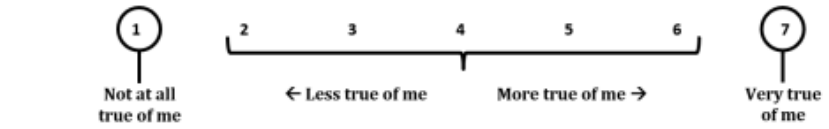
Your English teacher will not see your individual responses to these questions, so feel free to be honest.

Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

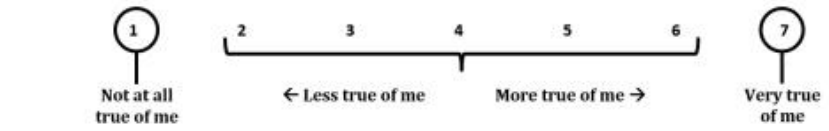


Find the number that best describes you

1.	In English, I prefer material that really challenges me so I can learn new things.	1	2	3	4	5	6	7
2.	If I study in appropriate ways, then I will be able to learn the material in English.	1	2	3	4	5	6	7
3.	When I take an English test, I think about how poorly I am doing compared to other students.	1	2	3	4	5	6	7
4.	I think I will be able to use what I learn in English in other subjects.	1	2	3	4	5	6	7
5.	I believe I will receive an excellent grade in English.	1	2	3	4	5	6	7
6.	I'm certain I can understand the most difficult material presented in English.	1	2	3	4	5	6	7
7.	Getting a good grade in English is the most satisfying thing for me right now.	1	2	3	4	5	6	7
8.	When I take an English test, I think about questions or other parts of the test I can't answer.	1	2	3	4	5	6	7
9.	It is my own fault if I don't learn the material in English.	1	2	3	4	5	6	7
10.	It is important for me to learn the material in English.	1	2	3	4	5	6	7



11. The most important thing to me right now is improving my overall grade average, so my main concern in English is getting a good grade.	1	2	3	4	5	6	7
12. I'm confident I can learn the basic concepts taught in English.	1	2	3	4	5	6	7
13. If I can, I want to get better grades in English than most of the other students.	1	2	3	4	5	6	7
14. When I take English tests, I think of the consequences of failing.	1	2	3	4	5	6	7
15. I'm confident I can understand the most complex material presented by my English teacher.	1	2	3	4	5	6	7
16. In English, I prefer subject material that arouses my curiosity, even if it is difficult to learn.	1	2	3	4	5	6	7
17. I'm very interested in the subject of English.	1	2	3	4	5	6	7
18. If I try hard enough, then I will understand the material in English.	1	2	3	4	5	6	7
19. I have an uneasy, upset feeling when I take an English test.	1	2	3	4	5	6	7
20. I'm confident I can do an excellent job on the assignments and tests in English.	1	2	3	4	5	6	7
21. I expect to do well in English.	1	2	3	4	5	6	7
22. The most satisfying thing for me in English is trying to understand the content as thoroughly as possible.	1	2	3	4	5	6	7
23. I think the subject material in English is useful for me to learn.	1	2	3	4	5	6	7
24. When I have the opportunity in English, I choose assignments that I can learn from, even if they don't guarantee a good grade.	1	2	3	4	5	6	7



25. If I don't understand the material in English, it is because I didn't try hard enough.	1	2	3	4	5	6	7
26. I like the content studied in English.	1	2	3	4	5	6	7
27. Understanding the content of English is very important to me.	1	2	3	4	5	6	7
28. I feel my heart beating fast when I take an English test.	1	2	3	4	5	6	7
29. I'm certain I can master the skills being taught in English.	1	2	3	4	5	6	7
30. I want to do well in English because it is important to show my ability to my family, friends, teacher or others.	1	2	3	4	5	6	7
31. Considering the difficulty of English, my teacher, and my skills, I think I will do well in this subject.	1	2	3	4	5	6	7

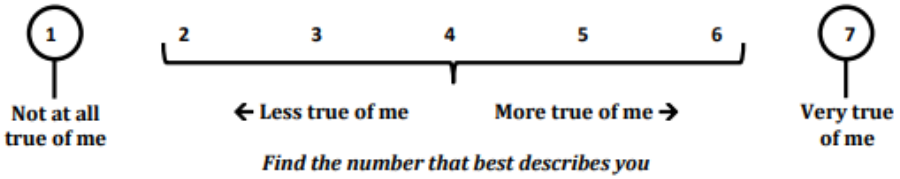
PART II. LEARNING STRATEGIES

The following questions ask about your **learning strategies and study skills** in the subject of English.

Again, there are no right or wrong answers, just answer as accurately as possible.

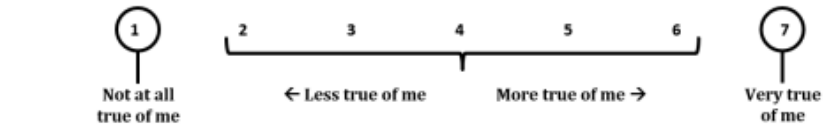
As before, your English teacher will not see your individual responses to these questions, so you can feel free to be honest.

Use the same scale to answer the remaining questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

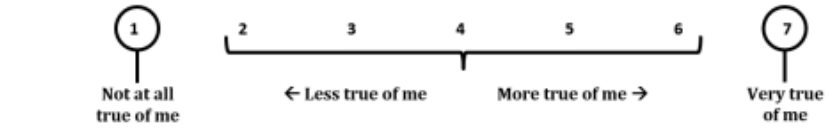


Find the number that best describes you

32. When I study the course materials for English, I outline the content to help me organise my thoughts.	1	2	3	4	5	6	7
33. During English lesson time, I often miss important points because I'm thinking of other things.	1	2	3	4	5	6	7
34. When I'm studying for English, I often try to explain the material to a classmate or friend.	1	2	3	4	5	6	7
35. I usually study for English in a place where I can concentrate on my work.	1	2	3	4	5	6	7
36. When reading for English, I make up questions to help focus my reading.	1	2	3	4	5	6	7
37. I often feel so lazy or bored when I study for English that I quit before I finish what I planned to do.	1	2	3	4	5	6	7
38. I often find myself questioning things I hear or read in English, to decide if I find them convincing.	1	2	3	4	5	6	7
39. When I study for English, I practise reading the material to myself over and over.	1	2	3	4	5	6	7
40. Even if I have trouble learning the material in English, I try to do the work on my own, without help from anyone.	1	2	3	4	5	6	7



41. When I become confused about something I'm reading for English, I go back and try to figure it out.	1	2	3	4	5	6	7
42. When I study for English, I go through the course materials and my lesson notes and try to find the most important ideas.	1	2	3	4	5	6	7
43. I make good use of my study time for English.	1	2	3	4	5	6	7
44. If course material for English is difficult to understand, I change the way I read the material.	1	2	3	4	5	6	7
45. I try to work with other students from my class to complete the assignments in English.	1	2	3	4	5	6	7
46. When studying for English, I read my lesson notes and the texts over and over again.	1	2	3	4	5	6	7
47. When a theory, interpretation or conclusion is presented in English lessons or in the course material, I try to decide if there is good supporting evidence.	1	2	3	4	5	6	7
48. I work hard to do well in English, even if I don't like what we are doing.	1	2	3	4	5	6	7
49. I make simple charts, diagrams, or tables to help me organise course material in English.	1	2	3	4	5	6	7
50. When studying for English, I often set aside time to discuss course material with a group of students from my class.	1	2	3	4	5	6	7
51. I treat the course material in English as a starting point and try to develop my own ideas about it.	1	2	3	4	5	6	7
52. I find it hard to stick to a study schedule for English.	1	2	3	4	5	6	7
53. When I study for English, I pull together information from different sources, such as lesson notes, course materials and discussions.	1	2	3	4	5	6	7
54. Before I study new course material in English thoroughly, I often skim it to see how it is organised.	1	2	3	4	5	6	7



55. I ask myself questions to make sure I understand the material I have been studying in English.	1	2	3	4	5	6	7
56. I try to change the way I study for English in order to fit the course requirements and my teacher's teaching style.	1	2	3	4	5	6	7
57. I often find that I have been reading for English but don't know what it was all about.	1	2	3	4	5	6	7
58. I ask my English teacher to clarify concepts I don't understand well.	1	2	3	4	5	6	7
59. I memorise key words to remind me of important concepts in English.	1	2	3	4	5	6	7
60. When English work is difficult, I either give up or only study the easy parts.	1	2	3	4	5	6	7
61. I try to think through a topic and decide what I am supposed to learn from it, rather than just reading it over when studying for English.	1	2	3	4	5	6	7
62. I try to relate ideas in English to those in other subjects whenever possible.	1	2	3	4	5	6	7
63. When I study for English, I go over my lesson notes and make an outline of important concepts.	1	2	3	4	5	6	7
64. When reading for English, I try to relate the material to what I already know.	1	2	3	4	5	6	7
65. I have a regular place set aside for studying English.	1	2	3	4	5	6	7
66. I try to play around with ideas of my own related to what I am learning in English.	1	2	3	4	5	6	7
67. When I study for English, I write brief summaries of the main ideas from the course material and my lesson notes.	1	2	3	4	5	6	7
68. When I can't understand the material in English, I ask another student in my class for help.	1	2	3	4	5	6	7



69. I try to understand the material in English by making connections between the course materials and the concepts from the lessons.	1	2	3	4	5	6	7
70. I make sure that I keep up with reading and assignments for English.	1	2	3	4	5	6	7
71. Whenever I read or hear an opinion or conclusion in English, I think about possible alternatives.	1	2	3	4	5	6	7
72. I make lists of important notes for English and memorise the lists.	1	2	3	4	5	6	7
73. I attend lessons in English regularly.	1	2	3	4	5	6	7
74. Even when English course materials are dull and uninteresting, I manage to keep working until I finish.	1	2	3	4	5	6	7
75. I try to identify students in my English class whom I can ask for help if necessary.	1	2	3	4	5	6	7
76. When studying for English, I try to determine which concepts I don't understand well.	1	2	3	4	5	6	7
77. I often find that I don't spend very much time on English because of other activities.	1	2	3	4	5	6	7
78. When I study for English, I set goals for myself in order to direct what I do in the study period.	1	2	3	4	5	6	7
79. If I get confused taking notes in English lessons, I make sure I sort it out afterwards.	1	2	3	4	5	6	7
80. I rarely find time to review my notes or course materials before an English exam.	1	2	3	4	5	6	7
81. I try to apply ideas from course materials in other English lesson activities such as discussions.	1	2	3	4	5	6	7

Appendix D

Teacher-perception SRL survey instrument

University of Oxford
Department of Education
www.education.ox.ac.uk

[redacted]
MSc in Educational Assessment student
E-Mail: [redacted]

This survey asks you about your perception, as their teacher, of the self-regulatory ability and self-efficacy of your Year 7 and 8 students, in the subject of English.

It comprises two parts: Part I. Student self-regulation and Part II. Student self-efficacy.

Your students will not see your individual responses to these questions, so please feel free to be as honest as possible. Try to give a response for every student; avoid leaving any blank. Please also make sure that each final answer is clear.

Please return your completed survey to the researcher using the stamped addressed envelope enclosed. Your responses will be pseudoanonymised (any personal information that could visibly identify you and your students will be removed) prior to analysis, in conjunction with other data collected as part of this study.

Thank you for your further contribution to this research project.

[redacted]

Teacher participant name: _____

Teacher participant signature: _____

Date: _____

PART I. STUDENT SELF-REGULATION

Some learners are better at regulating their own learning than others. A learner who is good at self-regulation continually evaluates and controls their mental processes. If they realise that a particular learning strategy is not working, they will try a different strategy.

There are three general activities that make up self-regulation: planning; monitoring; and reflecting. Planning includes the learner setting themselves goals and analysing tasks. Monitoring includes the learner tracking their attention and asking themselves questions as they read. Reflecting includes the learner fine-tuning their mental processes, to check and correct their learning behaviours. A learner who regularly does all of these three general activities is a highly self-regulating learner.

Compared to other 11-13 year old students you have taught over the years in this type of educational setting, please rate each named student according to how strong you perceive their level of self-regulation to be in the subject of English.

Please indicate your rating by circling your chosen number on the scale of 1 (very low level) to 7 (very high level) as shown below:

Description	Very low level	Below average level	Slightly below average level	Average level	Slightly above average level	Above average level	Very high level
Rating	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Example	1	2	(3)	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7

PART II. STUDENT SELF-EFFICACY

Self-efficacy refers to a learner's perceived ability to think and behave in ways that allow them to complete tasks successfully and achieve their learning goals. For example, a learner with high self-efficacy shows ambition, regularly sets targets for themselves, puts in strong effort and shows persistence (particularly in the face of difficulty or distraction).

Compared to other 11-13 year old students you have taught over the years in this type of educational setting, please rate each named student according to how strong you perceive their level of self-efficacy to be in the subject of English.

Please indicate your rating by circling your chosen number on the scale of 1 (very low level) to 7 (very high level) as shown below:

Description	Very low level	Below average level	Slightly below average level	Average level	Slightly above average level	Above average level	Very high level
Rating	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Example	1	2	(3)	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7
Student name	1	2	3	4	5	6	7

Appendix E

Recruitment information sheet for parents/guardians

University of Oxford
Department of Education
www.education.ox.ac.uk

[redacted]
MSc in Educational Assessment student
E-Mail: [redacted]

Teachers' written feedback in English:
How does this relate to the pathways leading to self-regulated learning?

INFORMATION SHEET FOR PARENTS / GUARDIANS

Ethics Approval Reference: [CIA-22-090]

In partnership with researchers at the University of Oxford, [redacted] School has agreed to take part in a study investigating the nature and impact of written feedback in the subject of English, with regard to students' self-regulated learning. We would like to invite all students in Years 7 and 8, including your child, to be part of this study. It will generally not require much participation beyond that expected of students by normal curriculum teaching and learning activities at [redacted]. We very much hope you would like your child to take part, but before you decide, it is important that you understand why the study is being done and what it will involve.

Who is conducting this research?

The research project is organised by [redacted], former [redacted] Teacher [redacted] at [redacted], who is now completing their Masters in Educational Assessment with the Department of Education, University of Oxford. The research project is being supervised by [redacted]. This study has been reviewed by, and received ethics clearance, through the University of Oxford's Central University Research Ethics Committee, Reference: [CIA-22-090].

What are we trying to find out?

This project is looking at how written feedback given by teachers to 11-13 year old students in the subject of English facilitates self-regulated learning. Self-regulated learning is an independent, active and effective form of learning that involves students setting goals for their learning, then attempting to control and monitor their understanding, motivation and learning behaviours in pursuit of these goals. More is known about how feedback facilitates self-regulated learning in higher education settings. This project aims to understand more about the nature of written feedback at this educational stage, specifically focussing on the development of students' self-regulated learning ability.

More information about the project can be obtained by contacting the researcher, [redacted].

Why has my child been invited to take part?

We are inviting your child to take part because they are a young person, aged between 11 and 13 years, attending [redacted] School. We are inviting all members of Years 7 and 8 to take part.

Does my child have to take part?

No, you can ask questions about the study before deciding whether or not to allow your child to participate. If you do agree to participation, you may withdraw your child and their data from the study at any time, without giving a reason and without penalty, by advising the researchers of this decision.

What will happen if my child takes part?

The research will take place over the course of this academic year. Your child will be asked to participate at only a couple of points over this period. Their participation will all be during school hours and scheduled lessons, so will not require them to complete anything in their free time or time when they are at home.

On-going	As part of [redacted] on-going progress monitoring programme, your child will complete, or will already have completed this academic year, 'CAT4' computer-based standardised tests. Pseudoanonymised data from these tests will be collected as part of the study.
Stage 1	Your child will be asked to complete a questionnaire, which will focus on their study habits, learning skills and motivation for work in the subject of English. This will be administered during a Private Study session. The questionnaire will take around 15-20 minutes to complete. Pseudoanonymised questionnaires and data will be analysed and kept on file for a minimum of five years after publication of the research, after which they will be destroyed.
Possible Stage 2	**For only some forms**, samples of your child's extended written work in English over the course of the academic year, along with the written feedback from their teacher, will be photocopied and analysed. This will include samples of past work, from September 2021 onwards. Fully anonymised photocopies may be viewed by trained research assistants as part of the analysis process. Pseudoanonymised photocopies and data will be kept on file for a minimum of five years after publication of the research, after which they will be destroyed.

What are the advantages / disadvantages of taking part?

There is no intended risk to participants in this study. It will not involve participation in any activities that your child might not expect to encounter as part of their normal involvement with teaching and learning at [redacted].

By participating in the research, [redacted] would be contributing to research that aims to add to the existing body of research in this area, as to the nature of teachers' written feedback at this educational level; much of the existing research is based in higher education settings.

What happens to the data provided?

The information your child provides during the study is the **research data**. Any research data from which your child can be identified (name, date of birth, EAL information, CAT data, questionnaire data, samples of written work) is known as **personal data**.

Personal data will be stored on encrypted electronic devices and/or as encrypted files. This personal data will be retained for the duration of the research period. The majority of data will, however, be **pseudoanonymised** at the earliest stage possible (by removing all personal information that could directly

identify your child; only the researcher and research supervisor would be able to identify the participant via an encryption key). This **pseudoanonymised data** will also be stored on encrypted electronic devices and/or as encrypted files. The encryption key giving identities will be stored separately. This, and **other research data** will be stored for a minimum of five years after publication of the work of the research.

Consent forms will be retained for the duration of the study, and for as long as the school determines appropriate after research activities have concluded at the school.

The research and research supervisor will have access to the research data. Responsible members of the University of Oxford may be given access to data for monitoring and/or audit of the research. In the event of any technical issues, responsible members of University of Oxford IT Support may have incidental, temporary access to the data.

Once this research has been written up, a summary of the findings will be given to the school and will be made available to interested families.

What will happen to any samples taken from my child?

Fully anonymised photocopies may be viewed by research assistants as part of the analysis process. Pseudoanonymised questionnaires and samples of your child's written work in English, along with the written feedback from their teacher, will be photocopied and kept on file for a minimum of five years after publication of the research, after which they will be shredded.

If applicable, we will seek further permission from you and your child to use these photocopies within the write up of the research.

Will the research be published?

The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy and, in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate degree programme. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research.

This research will be written up as part of [redacted] Master's thesis. On successful submission of the thesis, it may be deposited online in the Oxford University archives to facilitate its use in future research. If so, the thesis will be openly accessible. We also aim to publish our findings in scientific journals, but this may be two to three years from the end of the study.

What if there is a problem?

If you have a concern about any particular aspect of this study, please contact:

[redacted]
MSc in Educational Assessment student
E-Mail: [redacted]

Or their supervisor:

[redacted]
15 Norham Gardens, Oxford, OX2 6PY
Telephone: [redacted]
E-Mail: [redacted]

I/we will acknowledge your concern within 10 working days and give you an indication of how it will be dealt with. If you remain unhappy or wish to make a formal complaint, please contact the Chair of the Education Departmental Ethics Committee at the University of Oxford who will seek to resolve the matter as soon as possible:

Chair
Education Departmental Research Ethics Committee
15 Norham Gardens, Oxford, OX2 6PY
Email: research.office@education.ox.ac.uk

Data Protection

The University of Oxford is the data controller with respect to your child's personal data and, as such, will determine how your child's personal data is used in the study. The University will process your child's personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest.

Further information about your rights with respect to your child's personal data is available from https://compliance.web.ox.ac.uk/individual-rights.

What should I do next?

Please fill in the digital consent form and return it to make clear whether you would like your child to take part in this study, or not. Please remember that you may withdraw your child at any time, without penalty and without giving a reason, by notifying the researcher.

If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact [redacted], who will be happy to speak to you.

Appendix F

Recruitment information sheet for students

University of Oxford
Department of Education
www.education.ox.ac.uk

[redacted]
MSc in Educational Assessment student
E-Mail: [redacted]

Teachers' written feedback in English:
How does this relate to the pathways leading towards self-regulated learning?

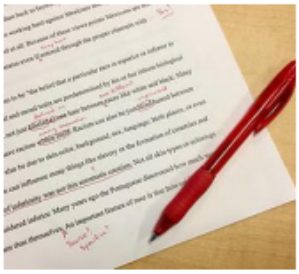
INFORMATION SHEET FOR YOUNG PEOPLE AGED 11 TO 13 YEARS

Ethics Approval Reference: [CIA-22-090]

We are inviting you to join in a research study organised by [redacted], who, as most of you know, is now completing their Master's in Educational Assessment with the Department of Education, University of Oxford.

Before you decide if you would like to join in, it's important to understand what the study is about, why we're doing it and what it would involve for you. Please read and think about this leaflet carefully. Please feel free to talk to your family, friends, or the researcher about it if you want. If anything isn't clear or you have more questions, ask your parent/guardian to contact us and we can discuss it with you and your parent/guardian.

Why are we doing this research?



Self-regulated learning is an independent, active and effective form of learning that involves you setting goals for your own learning, then attempting to control and monitor your understanding, motivation and behaviour to achieve them successfully.



This project is looking at how written feedback given by English subject teachers to students your age facilitates self-regulated learning. This project aims to understand more about the nature of written feedback in English, specifically focussing on its effect on the development of self-regulated learning ability.

Why have I been invited to take part?

We are inviting you to take part because you are a young person, aged between 11 and 13 years, attending [redacted] School. We are asking all members of Years 7 and 8 to take part.

Do I have to take part?

No, it is up to you; your participation is voluntary and not related in any way to your grades. If your parents/guardian provide consent for you to take part, we will also ask you to sign a form to say that you agree to take part. You are free to stop taking part at any time during the research without giving a reason, by telling the researcher. If you decide to stop, we will not use the information we have already collected from you.



What will happen if I take part?

The research will take place over the course of this academic year. You will be asked to participate at only a couple of points over this period. It will all be during school hours and scheduled lessons, so will not require you to do anything in your free time or at home.

On-going	As part [redacted] on-going progress monitoring programme with which you are familiar, your will complete, or may already have completed this academic year, the 'CAT4' computer-based standardised tests. Data from these tests will be collected as part of the study.
Stage 1	Firstly, you will be asked to complete a questionnaire, which will focus on your study habits, learning skills and motivation for work in the subject of English. This will be administered in a Private Study session. The questionnaire will take around 15-20 minutes to complete. Your responses will be analysed as part of the study.
Possible Stage 2	**For only some forms**, samples of your extended written work in English (e.g. essays) over the course of the academic year, along with your teacher's written feedback, will be photocopied and analysed as part of the study. This will include samples of past work, from September 2021 onwards.

What are the advantages / disadvantages of taking part?

There is no intended risk to you by taking part in this study. It will generally not involve participation in any activities that you might not expect to encounter as part of your normal involvement with teaching and learning.

By participating in the research, [redacted] would be contributing to research that aims to add to the existing body of research in this area, as to the nature of teachers' written feedback in the subject of English and at this educational level; much of the existing research is based in higher education settings.

What happens to the results of the study?

The information you provide during the study is the **research data**. Any research data from which you can be identified (name, date of birth, EAL information, CAT data, questionnaire data, samples of written work) is known as **personal data**.

Personal data will be stored on encrypted electronic devices and/or as encrypted files. This personal data will be retained for the duration of the research period. The majority of data will, however, be **pseudoanonymised** at the earliest stage possible (by removing all personal information that could directly identify you; only the researcher would be able to identify you via an encryption key). This **pseudoanonymised data** will also be stored on encrypted electronic devices and/or as encrypted files. The encryption key giving identities will be stored separately. This, and **other research data** will be stored for a minimum of five years after publication of the work of the research.



The researcher and research supervisor will have access to the research data. Responsible members of the University of Oxford may be given access to data for monitoring and/or audit of the research. In the event of any technical issues, responsible members of University of Oxford IT Support may have incidental, temporary access to the data.

What will happen to any samples I give?

Fully anonymised photocopies of your written work in English, along with the written feedback from your teacher, may be viewed by trained research assistants as part of the analysis process. Pseudoanonymised questionnaires and photocopied samples of your written work will be kept on file for a minimum of five years after publication of the research, after which they will be shredded. If applicable, we will seek further permission from you and your parent/guardian to use these photocopies within the write up of the research.

Will anyone else know I'm doing this?

Your teachers and your friends in Years 7 and 8 will probably know that you are participating in the study, but we will keep all of your questionnaire answers and samples of written work confidential. This means we will only tell those who have a need to know; this will generally just be those people directly involved in the research study, for example research assistants helping with data analysis. You don't have to discuss it with anyone if you don't want to; indeed, you are encouraged not to.

Your parent/guardian will know that you are participating, as they will have been asked to give their consent.

What if I don't want to take part in the research anymore?

Just tell your parent/guardian and [redacted] that you don't want to take part. You don't have to give a reason and no one will be annoyed with you; it is your choice.

Who is organising the research?

The research project is organised by [redacted], former [redacted] Teacher [redacted] at [redacted], who is now completing their Master's in Educational Assessment.

Who has reviewed the study?

Before any research involving people can start, it has to be checked by a Research Ethics Committee to make sure that it is okay for the research to go ahead. This study has been approved by the University of Oxford Central University Research Ethics Committee, Ethics Approval Reference [CIA-22-090].

What if there is a problem or something goes wrong?

Please tell us if you are worried about any part of this study, by contacting [redacted] initially. If you would prefer, you may also talk to your teacher or parent/guardian who will let the researcher know. If you are still uncertain, you or a teacher or parent/guardian can contact their supervisor, [redacted] ([redacted]). If you wish to make a formal complaint, contact the chair of the Education Departmental Research Ethics Committee at the University of Oxford:

Chair, **Education Departmental Research Ethics Committee**; research.office@education.ox.ac.uk; Department of Education, University of Oxford, 15 Norham Gardens, Oxford, OX2 6PY.

Data Protection

The University of Oxford is the data controller with respect to your personal data and, as such, will determine how your personal data is used in the study. The University will process your personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest.

Further information about your rights with respect to your personal data is available from https://compliance.web.ox.ac.uk/individual-rights.

Contact

If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact [redacted] by email initially ([redacted]).



----- Thank you for reading! -----

Appendix G

CUREC approval



Liam Gearon <liam.gearon@education.ox.ac.uk> Thu, Jan 27, 2022 at 1:53 PM
To: [redacted]
Cc: [redacted], Student CUREC <student.curec@education.ox.ac.uk>
Subject: CUREC

Dear [redacted]

Sorry for any delay here, I've just received this request. The office can provide you with a reference number.

Teachers' written feedback and students' responses: how do these respectively stimulate and illuminate the internal pathways leading to self-regulated learning? A case study

The above application has been considered on behalf of the Departmental Research Ethics Committee (DREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants.

Our prior discussion on this was very useful – an impressive team as ever, and project, vastly experienced, and a model of genuine care in relation to research ethics.

I am pleased to inform you, then, that, on the basis of the information provided to DREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly, approval has been granted.

Please continue to follow all current guidance issued by CUREC during the pandemic, notably COVID-19: CUREC guidance on research involving human participants, https://researchsupport.admin.ox.ac.uk/governance/ethics/coronavirus

If relevant please also check the CUREC website for their best practice research guides, these can be very useful in refining the writing up of ethical considerations in your research – see https://researchsupport.admin.ox.ac.uk/governance/ethics/resources/bpg

Student CUREC <student.curec@education.ox.ac.uk> Fri, Jan 28, 2022 at 4:01 PM
To: [redacted]

Reference number CIA-22-090

Note. Dissertation project title change to "Teachers' written feedback in English: How does this relate to the pathways leading towards self-regulated learning in 11-13 year-old students?" approved 2/8/2022

Appendix H

Frequency and *z*-score analysis to evaluate assumption of normality

Table H1

z-score values and frequencies for variables to identify potential outliers

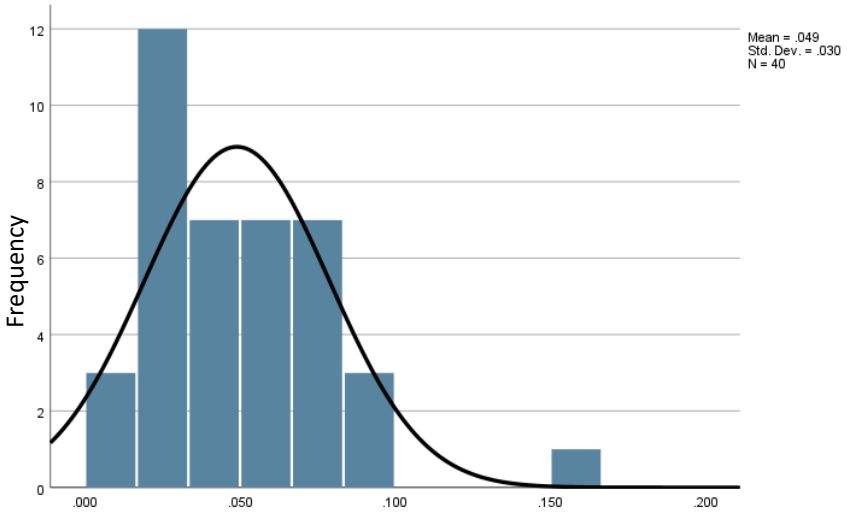
Variable	*N*	*z*-score	Frequency of *z*-score	Outlying student(s)
"Intrinsic goal orientation" MSLQ scale	76	-3.26335	1	7h8
"Critical thinking" MSLQ scale	76	-3.18263	1	2x5
"Metacognitive SR" MSLQ scale	76	-3.21461	1	2w9
"Effort regulation" MSLQ scale	77	-3.09210	1	7h8
Proportion of "Feedback about the processing of the task"	40	3.72156	1	5t9
Proportion of "planning" feedback	40	3.75479	1	3n5
Proportion of "persistence" feedback	40	4.52086	1	8z9

Note. Variables with *z*-scores > 3 were identified. Grey highlighted outlying students were removed from the final sample, where the absolute value of the *z*-score was > 3.29, i.e. significant at $p < .001$ (Field, 2018, p. 39).

Figure H1

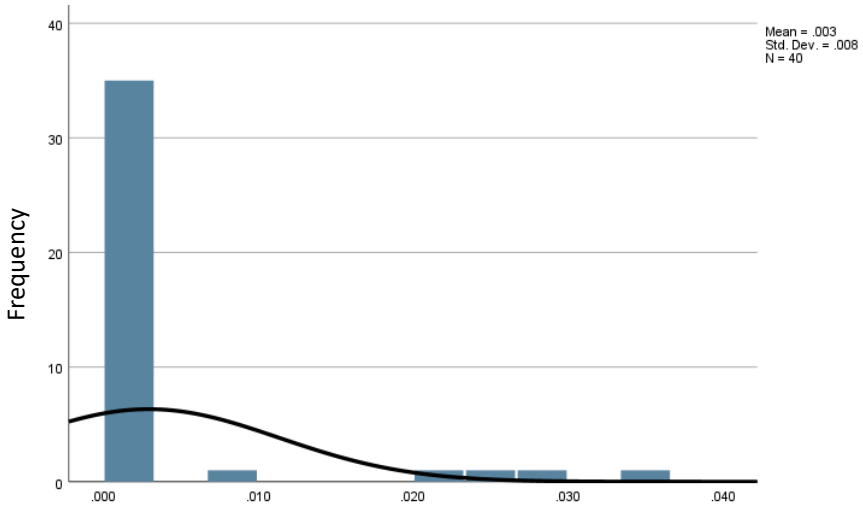
Frequency histograms for proportion of feedback variables with outlying data points

(a)



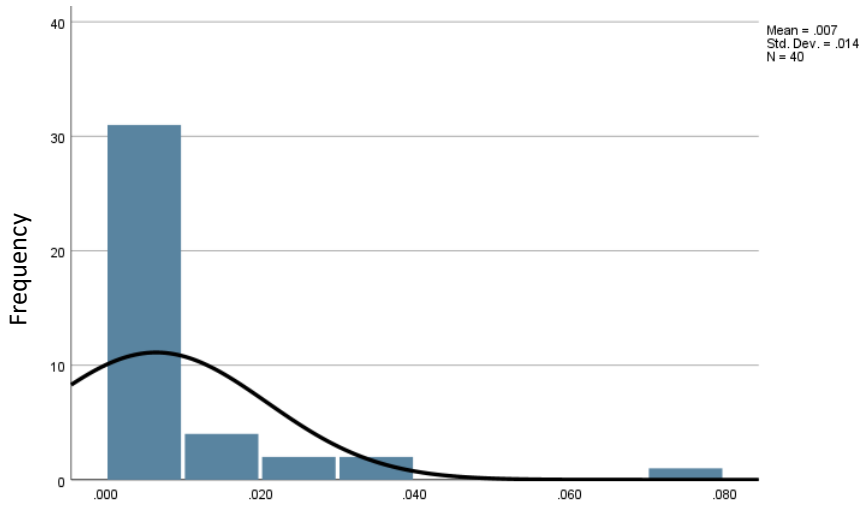
Proportion of "Feedback about the processing of the task"

(b)



Proportion of "planning" feedback

(c)



Proportion of "persistence" feedback

Appendix I

Skewness and kurtosis analysis to evaluate assumption of normality

Variable	*N*	Skewness			Kurtosis		
		Statistic	SE	*z*-score	Statistic	SE	*z*-score
Age (in years)	75	-.051	.277	-.184	-1.128	.548	-2.058
"Effort regulation" MSLQ scale	74	-1.056	.279	-3.783	.758	.552	1.373
Proportion of "planning" feedback	37	3.046	.388	7.859	8.153	.759	10.746
Proportion of "monitoring" feedback	37	1.336	.388	3.447	.518	.759	.683
Proportion of "ambition" feedback	37	1.054	.388	2.718	.287	.759	.378
Proportion of "effort" feedback	37	1.144	.388	2.951	-.132	.759	-.174
Proportion of "persistence" feedback	37	1.921	.388	4.956	2.438	.759	3.214

Note. Variables for which skewness and/or kurtosis statistics had an absolute value > 1 were identified. Variables (highlighted in grey) were removed from future analysis where values for skewness and kurtosis were both > 1.50 and the *z*-score for skewness and *z*-score for kurtosis were both > 3.29, i.e. significant at $p < .001$ (Field, 2018, p.248). *z*-scores for skewness (S) and kurtosis (K) calculated using equations:

$$Z_{\text{skewness}} = \frac{S-0}{SE_{\text{skewness}}} \qquad Z_{\text{kurtosis}} = \frac{K-0}{SE_{\text{kurtosis}}}$$

(Field, 2018, p. 248)

Appendix J

Descriptive statistics for proportions of feedback types as a percentage of the total feedback given, for individual teachers

Feedback type	Anna's subsample (*N* = 21)				Bob's subsample (*N* = 16)			
	Min	**Max**	***M***	***SD***	**Min**	**Max**	***M***	***SD***
Feedback about the task	46.7	73.6	63.9	7.8	45.2	72.6	58.6	8.3
Feedback about the processing of the task	0.0	8.5	3.9	2.2	2.0	9.6	5.2	2.5
Feedback about the self as a person	0.0	23.1	10.7	5.8	2.2	17.3	8.5	4.9
Feedback not about SRL	63.3	96.2	78.6	8.5	60.4	87.1	72.3	7.5
Planning	*0.0*	*2.8*	*0.1*	*0.6*	*0.0*	*2.4*	*0.3*	*0.8*
Monitoring	0.0	17.9	7.2	5.9	0.0	6.0	1.7	1.6
Reflecting	0.0	22.7	9.1	6.0	7.5	33.8	21.7	6.8
Feedback about SRL (Metacognitive)	3.8	33.3	16.4	7.4	10.8	36.0	23.8	6.7
Ambition	0.0	10.5	4.4	3.3	0.0	4.2	1.0	1.2
Effort	0.0	3.8	0.4	1.1	0.0	5.3	2.1	1.7
Persistence	*0.0*	*3.3*	*0.3*	*0.9*	*0.0*	*3.2*	*0.8*	*1.1*
Feedback about SRL (Self-efficacy)	0.0	11.4	5.0	3.6	0.0	7.7	3.9	2.3
Feedback about SRL	3.8	36.7	21.4	8.5	12.9	39.6	27.7	7.5

Appendix K

Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types

Table K1

*Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types, for Anna's students (*N *= 21)*

Teacher feedback type	1	2	3	4	5	6	7	8	9	10	11
1. Feedback about the task	–										
2. Feedback about the processing of the task	.11	–									
3. Feedback about the self as a person	-.34	.02	–								
4. Feedback not about SRL	**.71****	.37	.37	–							
5. Monitoring	**-.44***	-.10	-.24	**-.59****	–						
6. Reflecting	-.37	-.19	-.22	**-.54***	-.22	–					
7. Feedback about SRL (Metacognitive)	**-.65****	-.24	-.36	**-.91*****	**.63****	**.62****	–				
8. Ambition	-.31	-.32	-.22	**-.51***	-.01	.17	.14	–			
9. Effort	-.30	-.03	.17	-.17	**.53***	**-.50***	.01	.11	–		
10. Feedback about SRL (Self-efficacy)	-.33	-.38	-.14	**-.50***	.10	-.00	.08	**.93*****	.38	–	
11. Feedback about SRL	**-.71*****	-.37	-.37	**-1.00*****	**.59****	.54*	**.91*****	**.51***	.17	**.50***	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table K2

*Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types, for Bob's students (*N *= 16)*

Teacher feedback type	1	2	3	4	5	6	7	8	9	10	11
1. Feedback about the task	–										
2. Feedback about the processing of the task	**-.67****	–									
3. Feedback about the self as a person	-.28	.32	–								
4. Feedback not about SRL	**.70****	-.19	.45	–							
5. Monitoring	.11	-.21	-.07	.01	–						
6. Reflecting	**-.66****	.20	-.40	**-.92*****	-.26	–					
7. Feedback about SRL (Metacognitive)	**-.65****	.16	-.45	**-.95*****	.05	**.95*****	–				
8. Ambition	.01	.13	-.06	.01	.14	-.30	-.23	–			
9. Effort	-.46	.07	-.30	**-.68****	-.28	**.67****	**.59***	-.28	–		
10. Feedback about SRL (Self-efficacy)	-.39	.16	-.18	**-.50***	-.18	.25	.22	**.61***	**.51***	–	
11. Feedback about SRL	**-.70****	.19	-.45	**-1.00*****	-.01	**.92****	**.95*****	-.01	**.68****	**.50***	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Appendix L

Internal consistency coefficient analysis to evaluate MSLQ scales

Table L1

Comparison of internal consistency coefficients (Cronbach's α) for the MSLQ scales in the current study, compared to the manual (Pintrich et al., 1991)

Scale	*N*	Number items in scale	Cronbach's α		
			Current study	Manual	Diff. from manual
Overall MSLQ (full instrument)	60	81	.899	n/a	n/a
Intrinsic goal orientation	73	4	.532	.74	- .21
Extrinsic goal orientation	74	4	.531	.62	- .09
Task value	72	6	.754	.90	- .15
Control of learning beliefs	75	4	.450	.68	- .23
Self-efficacy for learning	74	8	.882	.93	- .05
Test anxiety	75	5	.706	.80	- .09
Rehearsal	75	4	.691	.69	.00
Elaboration	73	6	.686	.76	- .07
Organisation	73	4	.652	.64	.01
Critical thinking	73	5	.503	.80	- .30
Metacognitive self-regulation	73	12	.758	.79	- .03
Time and study environment	75	8	.741	.76	- .02
Effort regulation	74	4	.791	.69	.10
Peer learning	74	3	.569	.76	- .19
Help seeking	74	4	.551	.52	.03

Table L2

Internal consistency coefficients (Cronbach's α) for MSLQ scales where item removal leads to improvement in internal consistency

Scale	Item	Item content	Cronbach's alpha	
			Scale	Scale if item removed
Intrinsic goal orientation	24	When I have the opportunity in English, I choose assignments that I can learn from, even if they don't guarantee a good grade.	.532	.676
Extrinsic goal orientation	7		.531	.539
Task value	4		.754	.755
Control of learning beliefs	2	If I study in appropriate ways, then I will be able to learn the material in English.	.450	.566
Test anxiety	28		.702	.732
Elaboration	67		.686	.705
Critical thinking	38		.503	.515
Metacognitive self-regulation	44		.758	.761
Metacognitive self-regulation	57		.758	.784
Time and study environment	73		.741	.753
Help seeking	58	I ask my English teacher to clarify concepts I don't understand well.	.551	.661

Note. Grey highlighted items were removed to create revised scales, in cases where Cronbach's α values increased by > .10. Despite increase in α of >.10, item 58 in the "Help seeking" scale was left in; not only did it represent an important part of the construct, but the α was already higher than for the manual.

Appendix M

Pearson correlations (two-tailed, pairwise) between MSLQ scales

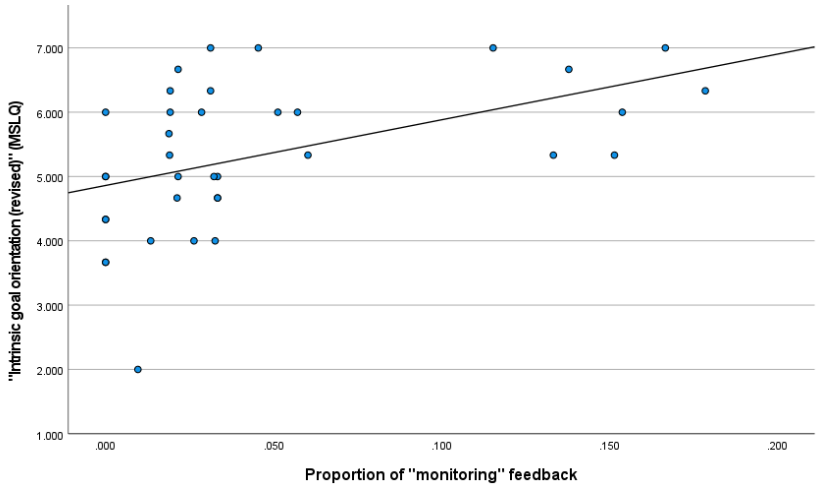
MSLQ scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Overall MSLQ (Revised)	–															
2. Intrinsic goal orientation (Revised)	**.54*****	–														
3. Extrinsic goal orientation	**.37****	.06	–													
4. Task value	**.62*****	**.50*****	.06	–												
5. Control of learning beliefs (Revised)	**.38****	.16	**.23***	.22	–											
6. Self-efficacy for learning	**.48*****	**.45*****	.17	**.48*****	.15	–										
7. Test anxiety	-.06	.02	**.29***	**-.23***	.11	**-.32****	–									
8. Rehearsal	**.55*****	.10	**.30****	**.33****	**.25***	.05	-.00	–								
9. Elaboration	**.78*****	**.55*****	.16	**.53*****	.06	**.24***	.02	**.39*****	–							
10. Organisation	**.62*****	**.26***	.07	**.39*****	.13	.15	-.11	**.58*****	**.53*****	–						
11. Critical thinking	**.51*****	**.46*****	**.24***	**.29***	**.26***	**.29***	.23	.13	**.54*****	.19	–					
12. Metacognitive self-regulation	**.84*****	**.33****	.21	**.54*****	.06	**.40*****	**-.34****	**.51*****	**.66*****	**.59*****	**.38****	–				
13. Time and study environment	**.67*****	**.26***	.07	**.53*****	.10	**.39*****	**-.32****	**.30****	**.43*****	**.45*****	.21	**.60*****	–			
14. Effort regulation	**.49*****	**.40*****	.01	**.51*****	-.10	**.44*****	**-.36****	.17	**.47*****	**.37****	.00	**.57*****	**.62*****	–		
15. Peer learning	**.51*****	.11	**.23***	.17	.03	-.05	-.06	**.54*****	**.37****	**.40*****	**.24***	**.45*****	.10	-.03	–	
16. Help seeking	**.26***	-.03	.16	.19	-.09	-.06	-.21	**.32****	**.27***	.14	.02	**.31****	.10	.10	**.62*****	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

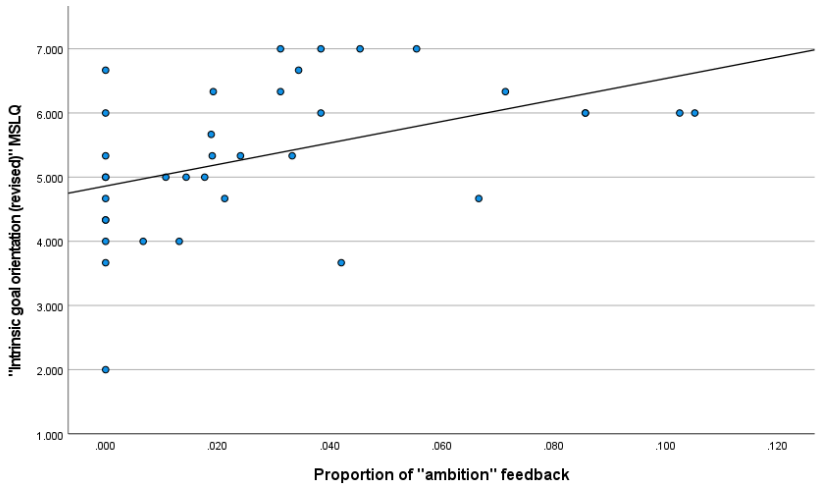
Appendix N

Scatterplots for key significant relationships between average proportions of different feedback types and MSLQ scales

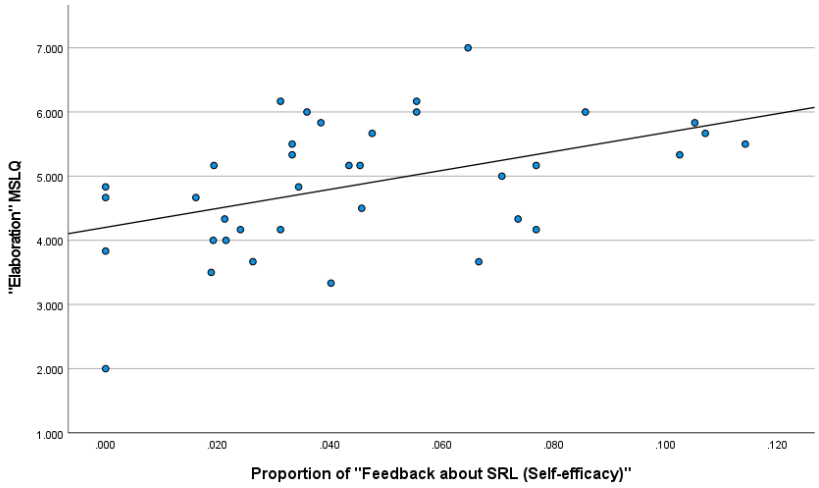
(a)



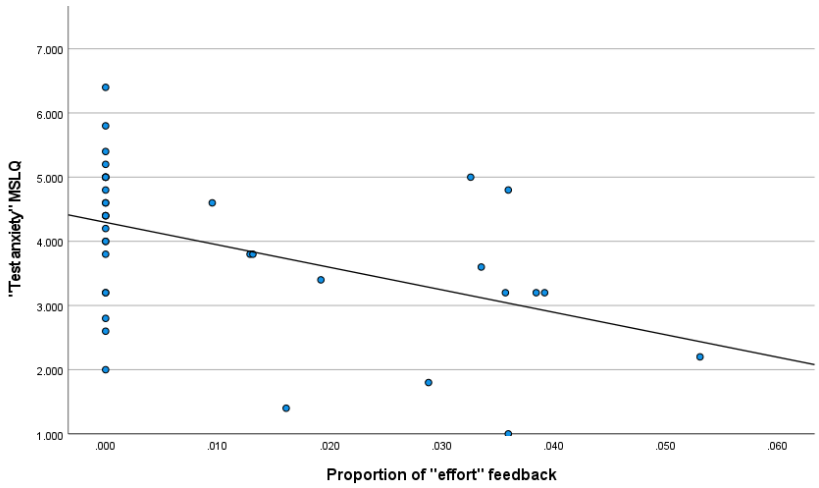
(b)



(c)



(d)


"Test anxiety" MSLQ
7.000
6.000
5.000
4.000
3.000
2.000
1.000
.000
.010
.020
.030
.040
.050
.060
Proportion of "effort" feedback

Appendix O

Pearson correlations between average proportions of different feedback types and MSLQ scales

Table O1

*Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types and MSLQ scales, for Anna's students (*N *= 21)*

Feedback type	MSLQ scale															
	Overall MSLQ (revised)	Intrinsic goal orientation (revised)	Extrinsic goal orientation	Task value	Control of learning beliefs (revised)	Self-efficacy for learning	Test anxiety	Rehearsal	Elaboration	Organisation	Critical thinking	Metacognitive self-regulation	Time and study environment	Effort regulation	Peer learning	Help seeking
Feedback about the task	-.45	-.23	.03	-.43	-.26	-.16	.26	-.14	-.37	-.14	**-.47***	-.31	**-.46***	-.38	-.11	-.00
Feedback about the processing of the task	-.13	-.29	-.05	.11	-.07	.16	.12	.04	-.23	.21	-.03	.12	.08	.16	-.25	-.22
Feedback about the self as a person	.12	-.23	.07	.18	.07	.28	-.17	.03	-.09	-.03	.21	.04	.01	-.06	.13	.04
Feedback not about SRL	-.37	-.44	.06	-.23	-.20	.09	.15	-.10	**-.46***	-.10	-.30	-.23	-.39	-.34	-.08	-.04
Monitoring	**.50***	.40	.15	.31	.42	.12	.02	.13	.35	-.17	.15	.36	.42	.22	.27	.22
Reflecting	-.10	.01	-.24	-.08	-.11	-.22	-.07	-.02	-.01	.13	.10	-.14	-.00	.08	-.13	-.05
Feedback about SRL (Metacognitive)	.32	.33	-.06	.21	.26	-.07	-.04	.12	.30	.02	.21	.20	.34	.25	.14	.16
Ambition	.27	.40	.01	.18	.04	.05	-.23	.08	**.45***	.33	.29	.13	.24	.36	-.15	-.27
Effort	.01	.13	-.20	.09	-.08	.04	-.28	-.17	.12	-.27	.03	.06	.22	.13	-.01	-.19
Feedback about SRL (Self-efficacy)	.24	.35	-.02	.13	-.06	-.05	-.29	-.02	**.47***	.18	.28	.15	.22	.29	-.11	-.25
Feedback about SRL	.37	.44	-.06	.23	.20	-.09	-.15	.10	**.46***	.10	.30	.23	.39	.34	.08	.04

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table O2

*Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types and MSLQ scales, for Bob's students (*N *= 16)*

Feedback type	MSLQ scale															
	Overall MSLQ (revised)	Intrinsic goal orientation (revised)	Extrinsic goal orientation	Task value	Control of learning beliefs (revised)	Self-efficacy for learning	Test anxiety	Rehearsal	Elaboration	Organisation	Critical thinking	Metacognitive self-regulation	Time and study environment	Effort regulation	Peer learning	Help seeking
Feedback about the task	-.37	-.48	.03	-.04	-.18	-.37	.34	-.22	-.18	-.18	-.15	-.18	-.03	-.12	-.13	-.05
Feedback about the processing of the task	.21	.05	-.39	-.18	-.11	.07	-.23	.02	-.06	.28	-.16	-.02	-.00	-.10	-.05	-.03
Feedback about the self as a person	-.23	.04	-.43	.04	.40	.32	-.05	-.44	-.34	-.49	.03	-.43	-.01	-.14	**-.54***	**-.59***
Feedback not about SRL	-.49	-.49	-.37	-.08	.03	-.18	.26	**-.52***	-.44	-.42	-.19	-.48	-.04	-.26	**-.51***	-.45
Monitoring	-.08	.27	.26	-.17	-.07	-.22	.33	.27	.01	-.02	-.32	-.08	.28	-.26	.49	.06
Reflecting	.38	.36	.36	.09	.20	.18	-.28	.35	.28	.35	.05	.37	.02	.17	.26	.26
Feedback about SRL (Metacognitive)	.43	.45	.43	.05	.15	.13	-.21	.47	.33	.40	.15	.39	-.07	.12	.46	.33
Ambition	-.17	.03	-.22	-.18	**-.71****	-.08	.26	.08	.06	.08	.02	-.07	.17	.04	.09	.19
Effort	.48	.31	.30	.31	-.08	.33	**-.59***	.41	.44	.24	.20	**.67****	.18	.44	.37	**.53***
Feedback about SRL (Self-efficacy)	.29	.29	-.05	.11	**-.52***	.21	-.24	.35	.46	.23	.19	.44	.35	.49	.33	.49
Feedback about SRL	.49	.49	.37	.08	-.03	.18	-.26	**.52***	.44	.42	.19	.48	.04	.26	**.51***	.45

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Appendix P

Pearson correlations between teacher-perception SRL scales

Table P1

*Pearson correlations (two-tailed, pairwise) between "Metacognitive SR", "Self-efficacy" and "Overall mean" teacher-perception SRL scales, for the full sample (*N *= 75)*

Variable	1	2	3
1. Teacher-perceived Metacognitive SR	–		
2. Teacher-perceived Self-efficacy	**.85*****	–	
3. Overall mean teacher-perceived SRL	**.96*****	**.96*****	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table P2

*Pearson correlations (two-tailed, pairwise) between "Metacognitive SR", "Self-efficacy" and "Overall mean" teacher-perception SRL scales, for Anna's students (*N *= 21)*

Variable	1	2	3
1. Teacher-perceived Metacognitive SR	–		
2. Teacher-perceived Self-efficacy	**.44***	–	
3. Overall mean teacher-perceived SRL	**.81*****	**.88*****	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table P3

*Pearson correlations (two-tailed, pairwise) between "Metacognitive SR", "Self-efficacy" and "Overall mean" teacher-perception SRL scales, for Bob's students (*N *= 16)*

Variable	1	2	3
1. Teacher-perceived Metacognitive SR	–		
2. Teacher-perceived Self-efficacy	**.83*****	–	
3. Overall mean teacher-perceived SRL	**.96*****	**.96*****	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table P4

*Pearson correlations (two-tailed, pairwise) between "Metacognitive SR", "Self-efficacy" and "Overall mean" teacher-perception SRL scales, for Charles' students (*N *= 20)*

Variable	1	2	3
1. Teacher-perceived Metacognitive SR	–		
2. Teacher-perceived Self-efficacy	**.86*****	–	
3. Overall mean teacher-perceived SRL	**.96*****	**.97*****	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table P5

*Pearson correlations (two-tailed, pairwise) between "Metacognitive SR", "Self-efficacy" and "Overall mean" teacher-perception SRL scales, for David's students (*N *= 18)*

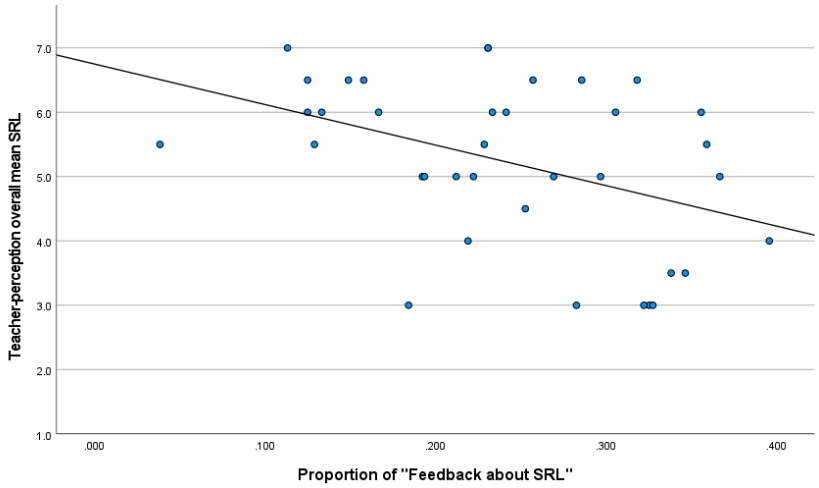
Variable	1	2	3
1. Teacher-perceived Metacognitive SR	–		
2. Teacher-perceived Self-efficacy	**.70*****	–	
3. Overall mean teacher-perceived SRL	**.90*****	**.94*****	–

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

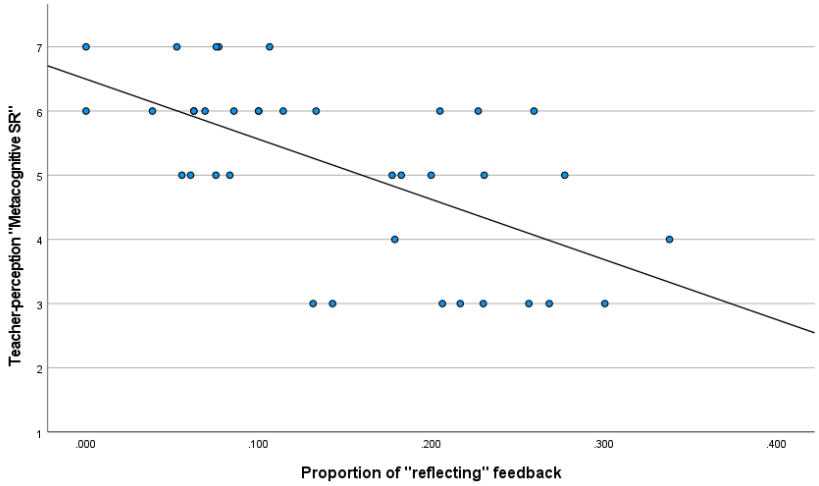
Appendix Q

Scatterplots for key significant relationships between average proportions of different feedback types and teacher-perception SRL scales

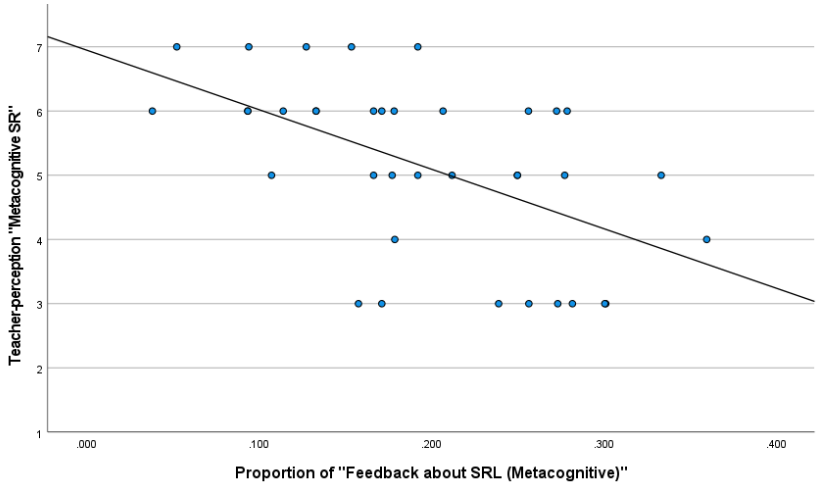
(a)



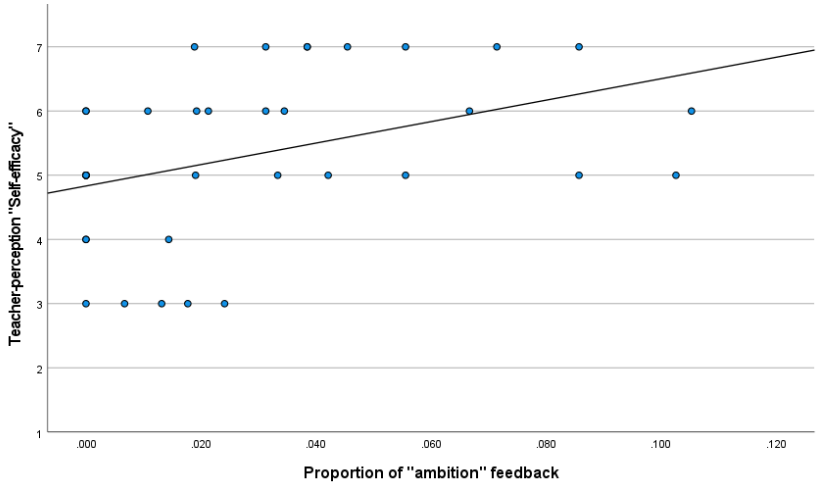
(b)



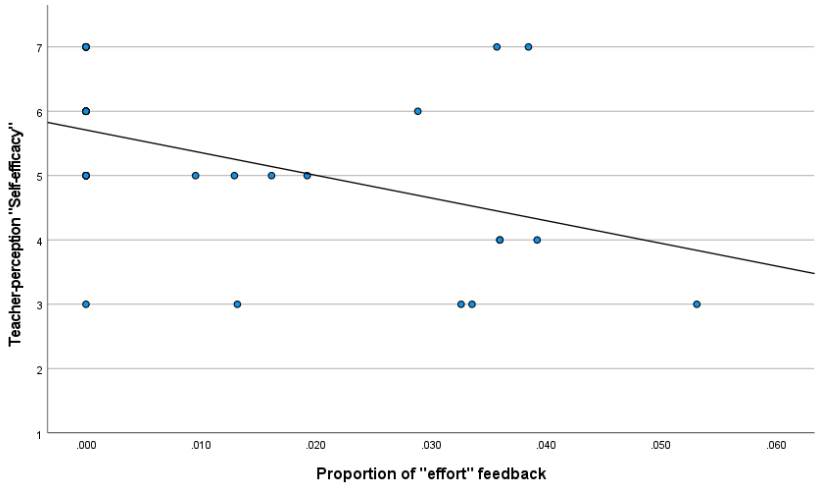
(c)



(d)


Teacher-perception "Self-efficacy"
7
6
5
4
3
2
1
.000
.020
.040
.060
.080
.100
.120
Proportion of "ambition" feedback

(e)


Teacher-perception "Self-efficacy"
7
6
5
4
3
2
1
.000
.010
.020
.030
.040
.050
.060
Proportion of "effort" feedback

Appendix R

Pearson correlations between average proportions of different feedback types and teacher-perceived SRL survey scales

Table R1

*Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types and teacher-perceived SRL survey scales, for Anna's students (*N *= 21)*

Feedback type	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Feedback about the task	.05	.04	.05
Feedback about the processing of the task	.30	-.13	.08
Feedback about the self as a person	.38	-.01	.19
Feedback not about SRL	.39	-.01	.20
Monitoring	-.38	.18	-.08
Reflecting	-.22	-.19	-.24
Feedback about SRL (Metacognitive)	**-.51***	-.03	-.29
Ambition	.08	.04	.07
Effort	.23	.36	.36
Feedback about SRL (Self-efficacy)	.14	.09	.13
Feedback about SRL	-.39	.01	-.20

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table R2

*Pearson correlations (two-tailed, pairwise) between average proportions of different feedback types and teacher-perceived SRL survey scales, for Bob's students (*N *= 16)*

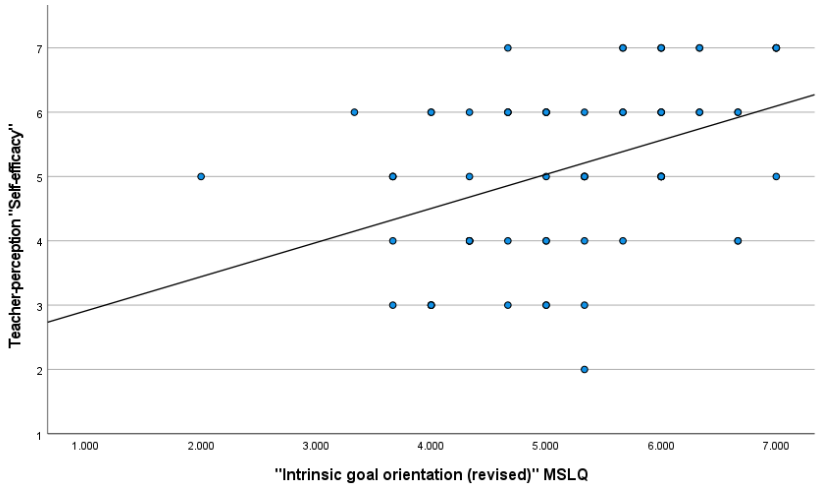
Feedback type	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Feedback about the task	-.19	-.13	-.17
Feedback about the processing of the task	.33	.28	.31
Feedback about the self as a person	**.50***	**.63****	**.59***
Feedback not about SRL	.23	.36	.31
Monitoring	-.22	-.26	-.25
Reflecting	-.07	-.28	-.18
Feedback about SRL (Metacognitive)	-.17	-.38	-.29
Ambition	-.18	.04	-.08
Effort	-.34	-.44	-.41
Feedback about SRL (Self-efficacy)	-.26	-.07	-.17
Feedback about SRL	-.23	-.36	-.31

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

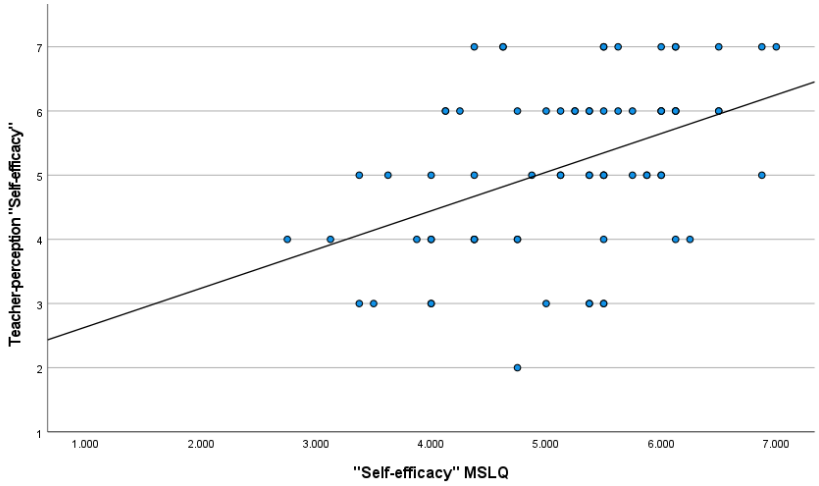
Appendix S

Scatterplots for key significant relationships between teacher-perception SRL scales and MSLQ scales

(a)



(b)



Appendix T

Pearson correlations between teacher-perception SRL scales and MSLQ scales

Table T1

*Pearson correlations (one-tailed, pairwise) between teacher-perception SRL scales and MSLQ scales, for Anna's students (*N *= 21)*

MSLQ scale	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Overall MSLQ (Revised)	-.18	.10	-.04
Intrinsic goal orientation (Revised)	.00	**.57****	**.38***
Extrinsic goal orientation	-.32	-.09	-.23
Task value	-.02	.32	.20
Control of learning beliefs (Revised)	-.22	.11	-.05
Self-efficacy for learning	.14	.33	.29
Test anxiety	-.17	-.10	-.16
Rehearsal	-.28	.02	-.13
Elaboration	-.25	.16	-.03
Organisation	.02	-.02	-.00
Critical thinking	-.07	-.14	-.13
Metacognitive self-regulation	-.17	.02	-.08
Time and study environment	-.22	.11	-.04
Effort regulation	.13	.13	.15
Peer learning	-.35	-.13	-.27
Help seeking	-.37	-.15	-.29

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table T2

*Pearson correlations (one-tailed, pairwise) between teacher-perception SRL scales and MSLQ scales, for Bob's students (*N *= 16)*

MSLQ scale	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Overall MSLQ (Revised)	-.22	-.09	-.16
Intrinsic goal orientation (Revised)	.15	.16	.16
Extrinsic goal orientation	**-.51***	**-55***	**-.56***
Task value	.08	.13	.11
Control of learning beliefs (Revised)	.38	.34	.38
Self-efficacy for learning	.25	.22	.24
Test anxiety	-.11	-.02	-.07
Rehearsal	-.41	**-.47***	**-.46***
Elaboration	-.31	-.10	-.22
Organisation	-.17	-.09	-.13
Critical thinking	.04	.03	.04
Metacognitive self-regulation	-.33	-.26	-.31
Time and study environment	-.16	.17	.01
Effort regulation	-.08	.14	.03
Peer learning	**-.51***	**-.44***	**-.50***
Help seeking	**-.51***	**-.48***	**-.52***

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table T3

*Pearson correlations (one-tailed, pairwise) between teacher-perception SRL scales and MSLQ scales, for Charles' students (*N *= 20)*

MSLQ scale	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Overall MSLQ (Revised)	.45	.26	.36
Intrinsic goal orientation (Revised)	.39	.23	.32
Extrinsic goal orientation	-.15	-.33	-.25
Task value	-.12	-.13	-.13
Control of learning beliefs (Revised)	.02	.03	.02
Self-efficacy for learning	.21	**.40***	.32
Test anxiety	-.23	-.37	-.31
Rehearsal	-.25	-.15	-.21
Elaboration	**.67*****	**.40***	**.55****
Organisation	.13	.08	.11
Critical thinking	.36	.14	.25
Metacognitive self-regulation	.37	.15	.26
Time and study environment	.28	.21	.25
Effort regulation	.35	.23	.30
Peer learning	.00	-.02	-.01
Help seeking	-.28	-.36	-.33

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.

Table T4

*Pearson correlations (one-tailed, pairwise) between teacher-perception SRL scales and MSLQ scales, for David's students (*N *= 18)*

MSLQ scale	Teacher-perception SRL scale		
	Metacognitive SR	Self-efficacy	Overall mean
Overall MSLQ (Revised)	.28	.10	.20
Intrinsic goal orientation (Revised)	.37	**.47***	**.46***
Extrinsic goal orientation	.07	.22	.17
Task value	.00	-.21	-.13
Control of learning beliefs (Revised)	**.44***	.37	**.43***
Self-efficacy for learning	**.44***	**.53***	**.54***
Test anxiety	**-.67****	-.34	**-.53***
Rehearsal	.03	-.05	-.02
Elaboration	-.00	-.17	-.11
Organisation	.15	-.13	-.01
Critical thinking	-.12	-.02	-.07
Metacognitive self-regulation	**.42***	.08	.25
Time and study environment	.30	.04	.17
Effort regulation	**.55****	**.40***	**.51***
Peer learning	.26	-.05	.09
Help seeking	.16	-.16	-.02

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Significant correlation values are shown in bold text.