frontiers | Frontiers in Education

TYPE Original Research
PUBLISHED 17 July 2023
DOI 10.3389/feduc.2023.1149332

OPEN ACCESS

EDITED BY
William Barlow,
University of Aberdeen, United Kingdom

REVIEWED BY
Elizabeth Fraser Selkirk Hannah,
University of Dundee, United Kingdom
Gro Marte Strand,
Norwegian University of Science and Technology, Norway

*CORRESPONDENCE
Jorrick Beckers
✉ Jorrick.beckers@ou.nl

RECEIVED 21 January 2023
ACCEPTED 28 June 2023
PUBLISHED 17 July 2023

CITATION
Beckers J, Bolkenbaas S, Verbree A-R, Schils T, van Gog T and de Bruin A (2023) Easing the transition: do Talent Lessons and Talent Talks support students' self-regulated learning skills in the transition from primary to secondary education?
Front. Educ. 8:1149332.
doi: 10.3389/feduc.2023.1149332

Easing the transition: do Talent Lessons and Talent Talks support students' self-regulated learning skills in the transition from primary to secondary education?

Jorrick Beckers[1]*, Sandra Bolkenbaas[2], Anne-Roos Verbree[3], Trudie Schils[4], Tamara van Gog[5] and Anique de Bruin[6]

[1]Department of Education, Open University of the Netherlands, Heerlen, Netherlands, [2]VMBO Maasland, Lentiz, Maasland, Netherlands, [3]Education Center, University Medical Center Utrecht, Utrecht, Netherlands, [4]Department of Macro, International and Labor Economics, School of Business and Economics, Maastricht University, Maastricht, Netherlands, [5]Department of Education, Utrecht University, Utrecht, Netherlands, [6]Department of Educational Development and Research, School of Health Professions Education, Maastricht University, Maastricht, Netherlands

Introduction: The transition from primary to secondary school is a period that can affect students negatively, with regular drops in academic achievement observed. Training students' self-regulated learning skills might help prevent some of the negative outcomes associated with the transition. We investigate Talent Talk and Talent Lesson interventions, which aim to improve students' metacognitive and affective self-regulation through enhancement of personal significance and strengthening of task-analysis skills.

Method: The present study researched whether Talents Talks and Talent Lessons can be used to improve students' self-regulated learning skills, motivation, and self-efficacy. We employed a quasi-experimental 2×2 design comparing four groups (total $N = 233$), who received either Talent Talks or Talent Lessons, both, or neither. Students were tested at three separate moments on absolute monitoring accuracy and self-report measures of self-regulated learning, motivation, and self-efficacy, with the interventions being implemented between the first and second moment.

Results: There were no significant differences between conditions at any of the test moments.

Discussion: As such, there is at present no evidence suggesting that Talent Talks and Talent Lessons positively influence self-regulation, self-efficacy, and motivation. Effectiveness of the intervention might be increased if Talent Talks and Talent Lessons are adapted, so that students' reflections about talents are tailored to self-regulation of specific tasks.

KEYWORDS

transition, primary education, secondary education, self-regulated learning, talent, quasi-experiment

1. Introduction

Transitioning from primary school to middle school or secondary education constitutes a complex period in the life of young students, as they adjust to a new reality of becoming a student in a different school environment. Research demonstrates that for some students, this transition may have a negative impact on their academic performance and wellbeing, potentially

leading to achievement loss (Alspaugh, 1998), an increase in academic cheating (Anderman and Midgley, 2004), an increase in depression levels (West et al., 2010), higher levels of school anxiety (Goldstein et al., 2015), a decrease in motivation (Martin, 2009), and a decrease in self-regulated learning (SRL) behavior (van der Veen and Peetsma, 2009). Interestingly, the relationship between this school transition and SRL behavior seems to be a two-way street. Fomina et al. (2020) demonstrated that the level of conscious self-regulation predicted the level of well-being among students as they transitioned from primary to middle school. While studies that investigate the relationship between SRL and the transition between primary to secondary school are scarce, Memmott-Elison and Moilanen (2021) found that cognitive self-regulation predicted emotional self-regulation in a 10-year longitudinal study, which included the transition from primary to secondary school. Furthermore, Meusen-Beekman et al. (2015) suggest that SRL-training should be started in primary education to be effective in secondary education, based on research into differences between the two contexts regarding the instruction of SRL. This suggests that much like in the Blair and Diamond (2008) study, SRL skills might act as a prophylactic, shielding against some of the detrimental effects the transition may impose. Perhaps more importantly, the transition period seems to be a period in which it is crucial to deploy interventions to prevent SRL skills from deteriorating.

In the present study, we test the effectiveness of supporting primary school students' SRL skills in the transition to secondary education by means of Talent Lessons and Talent Talks, which constitute existing practical interventions, aimed at helping students discovering and utilizing their talents and are often used in primary schools in the Netherlands. This study thus fulfills an important role in empirically validating already existing practical interventions that are thought to be useful, a method that is gaining popularity (*cf.* Feron and Schils, 2020).

Transitions from primary to secondary school are phenomena that are conceptualized in a great deal of ways. In a systematic review looking into worldviews, theories, and frameworks regarding these transitions, Jindal-Snape et al. (2021) found that hardly any studies explicitly state their views on the concept of transitions. Yet, Jindal-Snape et al. (2021) state that these conceptualizations, congruent research design, and theoretical grounding of findings are of paramount importance toward study robustness. In this study, transitions from primary to secondary school are seen a normative life event; the transition from primary to secondary school constitutes a period in which the students need to adapt a changing context. In the Netherlands, this is a fairly abrupt change. Typically, primary schools do not demand much in terms of SRL skills, while secondary schools make a much stronger appeal to these skills. The theoretical focus of this study is explicitly placed on SRL and ways to improve associated skills among students. We perceive transitionary period to be a context in which development of SRL skills might carry extra weight.

Like transitions, SRL is conceptualized in different ways (see Panadero, 2017), but the conceptualization of the process of Zimmerman (2002) is very influential. He describes a cyclical model consisting of three separate phases: The forethought phase, the performance phase, and the self-reflection phase. The forethought phase includes processes that occur *before* students engage in actual learning. During this time, students spend time on task-analysis and self-motivation. The performance phase occurs *during* a learning activity. Students use self-observation and self-control to deploy learning strategies as planned in the forethought phase and to self-record the learning process as it happens. Finally, the self-reflection phase typically occurs *after* a learning activity. Students use self-judgment and self-reaction to make a judgment whether task execution was successful and to regulate their motivation and emotion. Importantly, Nelson and Narens (1990) discern two interdependent processes that are important for self-regulation, being monitoring, and control. Monitoring to evaluate how the learning is going and what action is needed, while control produces the action.

Well-developed SRL skills can contribute to academic achievement (Elhusseini et al., 2022). However, research shows that accurately monitoring your own performance is difficult. Typically, learners tend to overestimate their own performance on learning tasks (Lippmann et al., 2021). This is problematic because accurate monitoring is essential to accurate regulation. Research shows that accurate monitoring leads to effective control (e.g., Rawson et al., 2011) and that inaccurate monitoring leads students to forego prospective benefits of self-regulated study opportunities (Thiede et al., 2017). Fortunately, research has yielded interventions that can successfully support development and improvement of monitoring and control (e.g., Dunlosky et al., 2003; Kostons et al., 2012; Baars et al., 2014). Traditionally, there has been a predominant focus on developing interventions targeting the (meta)cognitive domain of self-regulation. However, effective SRL also requires students to be motivated to improve their learning, and self-regulate their motivation for learning (e.g., Boekaerts and Cascallar, 2006).

Efklides et al. (2017) posit that metacognitive control is a result of both metacognitive and affective experiences. Effective control thus requires adequate regulation of affective experiences. Furthermore, Boekaerts and Pekrun (2015) state that students often experience friction between striving for positive learning outcomes on the long term and doing what satisfies needs on the short term, a friction that requires motivational/affective regulation. Increasingly, the SRL field is starting to direct attention toward the motivational/affective aspects of self-regulation. Current research focuses on understanding the nature of motivational/affective experiences in SRL. Li et al. (2021) for example have found emotion variability to be SRL-phase specific. Peistaraite and Clark (2020) found reappraisal as regulation strategy to be positively correlated to SRL strategy usage, while three other forms of regulation (suppression, rumination, and repression) were negatively correlated with SRL strategy use. Finally, Pennequin et al. (2020) established an association between metacognitive experiences and affective experiences in children from 8 to 12. Negative metacognitive experiences (such as a *high feeling of* difficulty) were correlated with maladaptive coping strategies (such as emotional outbursts). Aforementioned indicates that without proper regulation affective experiences may have an unwanted influence on SRL. Interventions are thus needed to help students regulate affect.

In the Netherlands, primary schools use two closely related interventions called *Talent Talks* and *Talent Lessons*, which are presumed to offer support both for (meta)cognitive as well as motivational/affective regulation. Both Talent Talks and Talent Lessons are based on a popular approach to helping adults (and in a later adaptation also children) recognize and utilize their talents (Dewulf, 2009; Dewulf et al., 2018). Talent as used in Talent Talks and Talent Lessons does not refer to a trait like scientific construct. Rather, talent in these interventions refers to any activity you can engage in

effortlessly (*cf.* the concept of *flow*; Seligman and Csikszentmihalyi, 2014) and leaves you in a state of fulfillment afterward.

Talent Talks are aimed at helping young students discovering their own talents. The talks are centered around one leading question: "What makes you happy?" This question is repeated until the student feels the most important things that make him/her happy have been shared. The Talent Talk continues with the adult trying to find why the things they have mentioned make them happy. All the while, the adult is visualizing the provided answers in a so-called talent drawing. From the created drawing and the discussion with the student, the adult will connect what makes him/her happy to the talents described in Dewulf et al. (2018). Thirty-nine separate talents can be distinguished (e.g., "Silent helper" and "Unraveller"). During the Talent Talks, the adult finds natural moments to compliment the student on his/her talents and insights. After the talk, the student takes the talent drawing home and is asked to reflect on his/her talents and where possible discuss with others.

Talent Talks are thought to activate *enhancement of personal significance*, which is a motivational strategy discussed by Schwinger et al. (2009), by elucidating what is personally significant to students. Enhancement of personal significance is a motivational regulation strategy aimed at matching a person's individual interests and preferences with the task at hand. Together with other motivational regulation strategies, enhancement of personal significance positively influences effort management, which in turn influences academic achievement (Schwinger et al., 2009). Furthermore, Talent Talks tend to focus on growth possibilities, establishing a positive relationship between student and adult, and helping the student gain more insight into their own strengths. All of these could help satisfy the need for autonomy, relationship, and competence as described in self-determination theory (SDT; Ryan and Deci, 2000), and hence increase motivation to learn. Furthermore, Talent Talks are also thought to enhance self-efficacy, which refers to students' beliefs about their ability to reach desired outcomes (Bandura, 1994). Research shows that autonomous forms of motivation seem to influence self-efficacy (e.g., Schunk and DiBenedetto, 2016; Duchatelet and Donche, 2019). As we expect (autonomous) motivation to be impacted by motivation regulation strategies, subsequently we also expect self-efficacy to be impacted.

Talent Lessons are also built around the 39 different talents that were previously mentioned. Next to deeper understanding of their talents, students also learn what happens when they exaggerate their talents. While talent Lessons are presumed to support motivational/affective regulation in a similar fashion to Talent Talks, they are also thought to support (meta)cognitive regulation. This support consists mainly of a series of assignments that helps students anticipate future situations, from a talent point of view. For example, students are invited to think about deploying their talents when they meet with new classmates. As the focus of the assignments is primarily on preparing for future learning tasks, this is thought to strengthen task-analysis skills in the forethought phase of Zimmerman (2002). While both Talent Talks and Talent Lessons are presumed by practitioners to have a positive effect on SRL, this has not yet been demonstrated empirically.

The current study aims to investigate whether Talent Talks and Talent Lessons can contribute to supporting students' SRL skills. We pose the following research question: What effect do Talent Talks and Talent Lessons have on monitoring accuracy, motivation, self-efficacy, and SRL. We employ a quasi-experimental 2×2 design with four conditions. The conditions include a control group (CON), a group that only participates in Talent Talks (TALK), a group that only participates in Talent Lessons (LESSON), and a group that partakes in Talent Talks as well as Talent Lessons (TALK-LESSON). Our hypothesis was as follows: Students' scores in the TALK, LESSON, and TALK-LESSON conditions increase from pre-test to post-test on measures of self-efficacy, motivation, monitoring accuracy, and general measures of SRL, more so than CON.

2. Methods

2.1. Design and participants

A mixed design was used in this study with condition as between-subjects factor and test moment as within-subjects factor. In total, 231 Dutch primary school students from 12 different classes of 12 different schools were randomly assigned to CON ($n = 59$), LESSON ($n = 47$), TALK ($n = 68$), or TALK-LESSON ($n = 57$). Due to practical constraints, students of four schools were randomly assigned to only two out of the four conditions (hence, some fluctuation in participant numbers across conditions). Furthermore, an additional 13th school participated but was excluded from analyses as random assignment was not possible here. Of the remaining 231 students, 50.2% was female, 49.4% male, 0.4% non-binary, M_{age} at pretest = 11.5 ($SD = 0.60$), and 88.9% spoke Dutch at home, the remainder of the participants spoke another language or a both Dutch and another language(s) at home.

Participants were tested prior to (pretest; T1) and directly after the experiment (posttest; T2), and after their transition to secondary education, 2–3 months after the experiment (follow-up test; T3). At T3, 128 students of the total sample were tested.[1] These students were enrolled in seven different secondary schools, 33.6% was enrolled in the pre-university track (Dutch: vwo), 25% in the senior general education track (Dutch: havo), 31.3% in the pre-vocational education track (Dutch: vmbo, mavo), and 10.2% did something else.

2.1.1. The Dutch educational context

The Dutch educational system comprises three stages of education. While it is beyond the scope of this study to discuss it in length, we will provide a brief overview. For more detailed information, see Cotofan et al. (2022). During the first stage, primary education, students aged 4–12, all follow the same track. At the end of primary education, students are sorted to different tracks according to cognitive ability. Secondary education includes vmbo, havo, and vwo. Vmbo is a form of prevocational education; students in this track are typically aged between 12 and 16 years old. Havo is a form of education that prepares students for more complex forms of vocational education. Students in this track are typically between 12 and 17 years old. Finally, vwo prepares students to enter academic education; students in this track are typically between the ages of 12–18. Tertiary

1 Students within secondary education classes not part of the study at T1 and T2 in primary school were also tested at T3, with a total of 1,131 students tested at T3. However, in the current study, we limited our analyses to students who were included from primary school on.

education also comes in three forms, including mbo, hbo, and wo. Mbo refers to vocational education, which prepares students for a specific vocation, a vmbo degree grants access to this type of education. Students in the mbo track are typically between the ages of 16 and 20. Hbo prepares students for more complex vocations, but is still practically oriented; students can access this type of education with a havo degree. Students in this track are typically between the ages of 17 and 21. Finally, wo is academic, or scientific education, a vwo degree grants access to this type of education. Students are typically between the ages of 18 and 23. Please note that these reflect *typical* routes. Other routes and exceptions may apply.

2.2. Materials and measures

2.2.1. Pretest and posttests

The pretest (T1) took place halfway during students' last year of primary school. The posttest (T2) took place 4–6 weeks after the pretest, during students' last year of primary school. After students' transition from primary school to secondary school, the last posttest took place (T3). Posttest T3 was administered approximately 1 month after starting with the first year of secondary school. At each test moment, students completed the following activities and questionnaires to measure SRL.

2.2.2. Task-based measures of monitoring and regulation accuracy

At each test moment (T1, T2, and T3), students first read three texts and then were asked to generate five keywords (i.e., the most important words of a text) per text without looking at the text. Next, for each text, students answered how many questions they expected to answer correctly out of a total of five questions (i.e., Judgment of Learning; measure of monitoring). Participants were then asked to indicate which texts they would like to read again to better prepare for the test (i.e., restudy decision; measure of regulation). They were presented with the titles of the three texts listed below each other. They indicated with a check mark which text(s) they wanted to select for restudy ("Choose the texts you want to read again to prepare better for the test"). It was also possible to indicate that they did not want to reread any of the texts. Students did, however, not get the opportunity to restudy these text(s). Last, they were tested on their knowledge of each text, with five multiple-choice questions per text. The topics of the texts were animals (elephants, bears, and monkeys) and countries (Egypt, Southeast Asia, and Mexico). At the first measurement, students were randomly assigned to either the texts about animals or about countries. At the second measurement, they read the texts of the other topic. At the third measurement, students were randomly assigned to either texts about animals or countries regardless of which set of texts they were presented in the first two measurements. The average text length was 307 words ($SD = 14$).

Monitoring accuracy was operationalized as students' performance of a particular text subtracted from their JOL score of a particular text. The resulting number was unsigned and averaged over the three texts of the particular test occasion. A measure of regulation accuracy was used that compared students' performance to their restudy selections, with low performance scores combined with decisions to restudy a text or high-performance scores combined with decisions to not restudy a text resulted in high regulation accuracy and vice versa for low regulation accuracy (Van de Pol et al., 2021). Values closer to 1 indicate higher accuracy.

2.2.3. General measures of self-regulation

The Children's Perceived use of Self-Regulated Learning Inventory (CP-SRLI; Vandevelde et al., 2013) was used to measure participant's self-regulation, self-efficacy, and motivation. This instrument consists of 15 subscales measuring different aspects of self-regulated learning, of which five subscales were administered in the current study: motivation, self-efficacy for self-regulated learning, monitoring, motivational strategies, and self-evaluation. The items were scored on a five-point Likert scale ranging from (1) *completely disagree* to (5) *completely agree* for the scales motivation and self-efficacy for self-regulated learning and from (1) *never* to (5) *always* for the scales monitoring, motivational strategies, and self-evaluation.

2.2.3.1. Motivation

Motivation was measured using 14 items divided into four subscales: identified regulation (four items), intrinsic motivation (three items), extrinsic regulation (three items), and introjected regulation (four items). Example items for these four scales are, respectively, "I do my best for school because I want to learn new things," "I do my best for school because I like doing it," "I do my best for school because others (my parents, the teacher, etc.) oblige me to do so," and "I do my best for school because I would feel guilty if I did not do my best." For the identified regulation scale, Cronbach's alpha ranged from 0.81 to 0.87 across test moments, for intrinsic motivation from 0.87 to 0.89, for extrinsic regulation from 0.79 to 0.84, and for introjected regulation from 0.74 to 0.81.

2.2.3.2. Self-efficacy for self-regulated learning

Self-efficacy for self-regulated learning was measured using 13 items divided into two subscales: self-efficacy motivation, which assesses the extent to which students feel competent to regulate motivational aspects, and self-efficacy regulation, which examines the extent to which respondents feel competent to regulate their learning processes regarding cognitive and metacognitive aspects (Vandevelde et al., 2013). Example items for self-efficacy motivation and regulation are respectively: "I'm good at motivating myself to finish my schoolwork" and "I'm good at knowing what is important and less important when studying." For the self-efficacy motivation scale, Cronbach's alpha ranged from 0.79 to 0.84 across test moments and for the self-efficacy regulation scale from 0.80 to 0.84.

2.2.3.3. Monitoring

Seven items were used to measure students' monitoring. An example item is: "During my schoolwork, I ask myself: 'Do I still understand everything?'" Cronbach's alpha for this scale ranged from 0.62 to 0.76 across test moments.

2.2.3.4. Motivational strategies

Four items were used to measure students' motivational strategies. An example item is: "During my schoolwork, I motivate myself to keep working." Cronbach's alpha for this scale ranged from 0.72 to 0.81 across test moments.

2.2.3.5. Self-evaluation

Students' self-evaluation was measured using seven items divided into two subscales: process evaluation, which reflects the evaluation of learning processes, and product evaluation, referring to the evaluation of learning outcomes (Vandevelde et al., 2013). Example

items for self-evaluation of the process and product are, respectively, "After finishing my schoolwork, I check that I have not forgotten anything" and "After finishing my schoolwork, I ask myself: 'Did that way of doing it work well?'" Cronbach's alpha for the product evaluation scale ranged from 0.73 to 0.79 across test moments and for the process evaluation scale from 0.74 to 0.82.

2.2.4. Intervention

One to three weeks after the pretest, the intervention took place. The intervention consisted of Talent Lessons, Talent Talks, or a combination of both. Students in the control group did not participate in any intervention. Students in the control condition followed regular lessons as planned in the curriculum.

2.2.4.1. Talent Lessons

Three Talent Lessons (all group lessons) of approximately 80–90 min were followed by students in LESSON and TALK-LESSON condition. The first Talent Lesson included activating students' prior knowledge about the concept of talent, an instruction video about the concept of talent, making a talent test, making a talent card, learning talents in quizlet ending with a test, and a talent assignment. The second Talent Lesson included a talent reception, making a mind map about talent, instruction about learning pits and talents, a quizlet test, instruction about recognizing talents in class, and a talent assignment. The third and last talent lesson included a quizlet talent test, instruction about talents and learning pits, a talent assignment, an assignment for which students introduced themselves based on their talents, instruction on collaboration and talent, instruction on talent and secondary education, talent reception, and a final talent assignment. The lesson ended with a short evaluation and closing of the lesson series. The Talent Lessons contain elements (e.g., activating students' prior knowledge about the concept of talent) aimed understanding what the talent concept entails as well as elements aimed at understanding how to use one's own talents (e.g., the instruction about learning pits). Especially, the elements in the latter category are assumed to help students develop task-analysis skills.

2.2.4.2. Talent Talks

A Talent Talk of approximately 20 min was held with each student individually who was assigned to the condition TALK and TALK-LESSON. The main aim of the Talent Talk was to provide students with insight into and awareness about their talents and to invest into the teacher-student relation by showing interest and attention in a one-on-one setting. In the Talent Talk, the teachers asked students what makes them happy, what energized them. This was noted down on a piece of paper. Students were allowed to choose the colors of the pencils to be used to make them feel welcome. The teacher started with saying that the paper is going to be an important drawing because it shows students' talents. First, the teacher wrote the students' name in the middle of the paper and then asked what made the students happy. The teacher noted and/or drew the answers of the students (at least 4 or 5) on the paper in students' own words. Also, the teacher tried to link students' answers. Next, the teacher asked a follow-up question: Why do these things make them happy? The teacher provided the students with compliments during the conversation. At the end of the conversation, the teachers asked whether students wanted to add anything to their personal talent drawing. Last, the teacher encouraged students to talk about the talent drawing at home. Most of the Talent Talks are aimed at understanding personal talents, which is assumed to empower the enhancement of the personal significance motivational strategy, because students can look at their education through a talent perspective; students can motivate themselves by using opportunities to deploy their talents in learning activities. Furthermore, the Talent Talks are one-on-one conversations with a lot of personal attention aimed at building a personal relation, this is thought be motivating.

2.2.4.3. Talent Lessons and Talent Talks

In the TALK-LESSON condition, students participated both in the Talent Lessons and had a Talent Talk with their teacher. Due to practical constraints, Talent Talks could take place before, in between, or after the Talent Lessons. Talent Lessons and Talent Talks were provided by students' own teacher. Teachers followed a 1-h online session before providing the interventions in which it was explained how to hold a Talent Talk and how to provide the Talent Lessons. They also watched a video of a Talent Talk and read the outline of the Talent Lessons.

2.3. Procedure

The pretest and posttests were administered to students in their own classroom by a researcher, with their teacher being present. The interventions were provided by students' own teacher. The Talent Lessons were pre-recorded by the researchers so that students' own teacher could show the recorded lesson and every student got the same intervention. The Talent Talks were demonstrated twice by the researchers and performed by the teachers once under guidance of the researchers before the teachers continued without supervision. All measures were administered online via Microsoft Forms. Students and their parents/caregivers were informed about the study; participation was voluntary and students could withdraw at any moment. Participants and their parents gave passive informed consent. Ethical approval for this study was obtained from the Ethical Review Comittee Inner City Faculties of Maastricht University. The application was registered under number ERCIC_231_15_02_2021_Schils.

2.4. Data analysis

The analyses used in this study are as follows. To examine whether the intervention(s) influenced students' monitoring accuracy, a mixed ANCOVA was conducted with condition as between-subjects factors and time point as within-subjects factor. Although our data was nested (students were nested within schools), we did not have enough level 2 units (i.e., schools) to conduct a multilevel analysis (Maas and Hox, 2005). To account for the nested structure of the data, school dummies (i.e., 12 binary variables indicating each school, one as reference) were included as covariates in the analysis (*cf.* Van de Pol et al., 2019). The same analysis was used to examine whether the intervention(s) influenced students' regulation accuracy.

To examine whether the intervention(s) influenced students' self-efficacy, motivation, and self-regulation, a mixed MANCOVA was conducted with condition as between-subjects factor, time point as within-subjects factor, and teacher dummies as covariates. Assumptions were checked beforehand. Pillai's trace criterion was used in case of violations of normality and/or homogeneity of variance–covariance matrices (indicated by Box's *M*) as Pillai's trace is

argued to be the most robust multivariate test statistic for protection against departures from multivariate normality and homogeneity of variance–covariance matrices (Tabachnick et al., 2007). For within-subjects effect, the Greenhouse–Geisser correction was used in case of violations of sphericity, as indicated by Mauchly's test of sphericity. All analyses were conducted in IBM SPSS Statistics 27.0.

3. Results

There were no significant differences between conditions regarding students' gender, $\chi^2(6)$, $p = 0.125$, and age (at T1), $F(3, 226) = 0.55$, $p = 0.651$. The mean monitoring accuracy, regulation accuracy, and means of the self-regulation scales per test moment per condition are presented in Table 1.

3.1. Monitoring accuracy

The mixed ANCOVA indicated that there was no significant main effect of condition, $F(13, 96) = 1.15$, $p = 0.333$, and test moment, Pillai's Trace = 0.02, $F(2, 95) = 0.71$, $p = 0.493$, nor a significant interaction effect of condition and test moment, Pillai's Trace = 0.03, $F(6, 192) = 0.49$, $p = 0.814$, on monitoring accuracy. School was not a significant covariate.

3.2. Regulation accuracy

The mixed ANCOVA indicated that there was no significant main effect of condition, $F(3, 96) = 0.15$, $p = 0.931$, and test moment, Wilks' Lambda = 0.99, $F(2, 95) = 0.64$, $p = 0.530$, nor a significant interaction effect of condition and test moment, Wilks' Lambda = 0.93, $F(6, 190) = 1.17$, $p = 0.323$, on regulation accuracy. School was not a significant covariate.

3.3. Self-regulation

The Multivariate test showed no significant main effects of condition, Pillai's Trace = 0.36, $F(30, 267) = 1.21$, $p = 0.217$, and test moment, Pillai's Trace = 0.24, $F(20, 77) = 1.20$, $p = 0.275$, nor a significant interaction effect of test moment by condition, Pillai's Trace = 0.47, $F(60, 237) = 0.74$, $p = 0.920$, on the self-regulation variables. School was not a significant (between-subjects) covariate.

4. Discussion

This study investigated whether two popular interventions in Dutch education, Talent Talks, and Talent Lessons, would have beneficial effects on self-regulated learning (SRL) for students in transition from primary to secondary education. Our main research question was: what effect do Talent Talks and Talent Lessons have on self-assessment accuracy, motivation, self-efficacy, and SRL? Concerning our hypothesis, we found no differences between students in the control condition, the condition that only received Talent Lessons, the condition that only received Talent Talks, and the condition that received both Talent Talks and Talent Lessons regarding pre-test and post-test measures of self-efficacy, motivation, monitoring accuracy, and general measures of SRL.

The most logical explanation for a lack of differences between conditions is that the presumed intervention effect does not exist, or the intervention was not powerful enough. Schwinger et al. (2009) describe five other motivational regulation strategies that our intervention did not target. Furthermore, on the cognition side, our intervention only targets a specific subpart of the Zimmerman (2002) forethought phase. So even if Talent Talks and Talent Lessons did target enhancement of personal significance and task-analysis effectively, the intervention might have been too limited in scope.

One potential other reason for why the intervention did not yield any beneficial effects on SRL in the present study, might be explained by the model of Efklides et al. (2017). In their model, self-regulation is always specified as a product between task and person; self-regulation must be object-oriented, it does not occur in a vacuum. While both our measures of self-regulation accuracy were certainly object-oriented, the intervention was far more general and aimed at general (motivation) regulatory features. Looking at studies where both measurement and intervention targeted specific regulation, effects did emerge. Michalsky (2013) for example, reported positive effects on academic achievement for groups receiving metacognitive and motivational/affective support and Ma et al. (2023) researched SRL in a collaborative learning context and found that raising cognitive-, social- and behavioral group awareness had a positive effect on self-efficacy and self-learning among others. So, when transfer of regulatory skills must occur from one domain (the intervention) to another (measurement) that might dampen the effect of the intervention. In fact, research does show that transfer of regulatory skills from one domain to another does not necessarily occur (Raaijmakers et al., 2018).

While the focus in our research has been on SRL, the study might have profited from a more holistic definition of transitions put forward by Jindal-Snape and Cantali (2019): "Transition is conceptualized as a dynamic and ongoing process of psychological, social, and educational adaptation over time due to changes in context, interpersonal relationships and identity, which can be both exciting and worrying at different times for different people, and requires ongoing support from a range of significant others" (p.3). We suspect that adhering to this idea of transition could have impacted our research for the better as an ecological view of transitions would have meant including a broader set of measures, capturing more facets of the ongoing process.

4.1. Implications

In order raise the efficacy of Talent Lessons and Talent Talks, we must consider bridging the gap between the fairly general regulation that is currently targeted and the rather specific regulation we expect from students. The best way to do this might be to connect the talents more explicitly to classroom regulation in both Talent Lessons and Talent Talks. One way to do this is by using the Talents as basis to construct task-specific prompts, which have been shown to support regulation in previous studies (e.g., Bannert and Reimann, 2012). An example might be along the lines of the following: "You are an 'unraveller', you know how to approach a task critically. Can you identify the criteria for executing task x successfully?." Naturally,

TABLE 1 Means (SD) absolute monitoring accuracy, regulation accuracy, and self-regulation scales per test moment per condition.

Measure	Timepoint	CON	LESSON	TALK	TALK-LESSON
Absolute monitoring accuracy	1	1.06 (0.66)	1.02 (0.48)	1.07 (0.67)	1.10 (0.56)
	2	0.91 (0.41)	0.92 (0.53)	1.22 (0.72)	1.01 (0.61)
	3	1.12 (0.56)	1.30 (0.91)	1.30 (0.56)	1.35 (0.81)
Regulation accuracy	1	0.56 (0.17)	0.46 (0.13)	0.52 (0.14)	0.49 (0.12)
	2	0.56 (0.18)	0.51 (0.15)	0.50 (0.14)	0.53 (0.19)
	3	0.44 (0.15)	0.50 (0.14)	0.50 (0.14)	0.52 (0.20)
Identified regulation	1	3.86 (0.86)	4.29 (0.71)	3.86 (0.78)	4.13 (0.70)
	2	3.94 (0.82)	4.18 (0.66)	3.89 (0.80)	4.00 (0.65)
	3	3.75 (0.98)	4.21 (0.72)	3.91 (0.70)	3.87 (0.64)
Intrinsic motivation	1	2.92 (1.25)	3.33 (1.02)	2.91 (1.14)	2.82 (0.96)
	2	2.97 (1.25)	3.33 (0.78)	2.86 (1.04)	3.04 (0.85)
	3	2.63 (1.10)	2.92 (1.08)	2.56 (0.98)	2.62 (0.91)
Extrinsic regulation	1	2.24 (0.90)	2.39 (1.02)	2.20 (0.90)	2.06 (0.69)
	2	2.12 (0.99)	2.49 (1.08)	2.30 (0.96)	2.05 (0.91)
	3	2.35 (1.19)	2.34 (1.01)	2.44 (1.05)	2.36 (1.02)
Introjected regulation	1	2.18 (0.75)	2.96 (0.86)	2.32 (0.86)	2.61 (1.11)
	2	2.36 (0.79)	2.95 (0.94)	2.52 (0.89)	2.55 (0.97)
	3	2.35 (0.85)	2.98 (1.03)	2.37 (1.04)	2.65 (0.85)
Self-efficacy motivation	1	3.51 (0.92)	3.84 (0.77)	3.56 (0.83)	3.79 (0.62)
	2	3.42 (0.79)	3.87 (0.75)	3.69 (0.76)	3.65 (0.59)
	3	3.22 (1.03)	3.73 (0.90)	3.51 (0.77)	3.56 (0.65)
Self-efficacy regulation	1	3.17 (0.64)	3.34 (0.58)	3.22 (0.58)	3.31 (0.44)
	2	3.19 (0.57)	3.35 (0.62)	3.29 (0.59)	3.22 (0.52)
	3	3.11 (0.69)	3.22 (0.77)	3.25 (0.73)	3.08 (0.49)
Monitoring	1	3.20 (0.50)	3.34 (0.64)	3.19 (0.51)	3.26 (0.56)
	2	2.95 (0.78)	3.45 (0.62)	3.29 (0.51)	3.18 (0.57)
	3	3.09 (0.68)	3.35 (0.57)	3.21 (0.68)	3.21 (0.54)
Motivational strategies	1	2.98 (0.92)	3.30 (0.89)	3.18 (0.92)	3.12 (0.82)
	2	2.70 (0.80)	3.53 (0.81)	3.14 (0.99)	3.11 (0.76)
	3	2.88 (1.09)	3.22 (1.08)	3.03 (0.91)	2.93 (0.77)
Self-evaluation—product	1	3.48 (0.85)	3.84 (0.66)	3.75 (0.75)	3.69 (0.71)
	2	3.47 (0.97)	3.89 (0.65)	3.76 (0.78)	3.62 (0.66)
	3	3.76 (0.73)	3.89 (0.72)	3.63 (0.81)	3.61 (0.64)
Self-evaluation—process	1	2.53 (0.82)	3.04 (0.90)	2.61 (0.81)	3.04 (0.80)
	2	2.56 (0.74)	3.10 (0.76)	2.88 (0.77)	3.04 (0.75)
	3	2.36 (0.70)	2.84 (1.08)	2.67 (1.04)	2.68 (0.72)

the measure instrument to capture SRL ability would also have relate to task x.

Another route to possibly enhance the intervention might lie in activating multiple strategies, both motivationally/affectively, as well as cognitively. Next to enhancement of situational interest and enhancement of personal interest Schwinger et al. (2009) describe *mastery-self talk*, *performance approach self-talk, performance-avoidance self-talk, and self-consequating.* Adapting the intervention so that it targets one or more of the other motivational regulation strategies might make it stronger. The same goes for the cognitive part of the intervention, which is presently limited to task-analysis. Including interventions that also target performance phase or self-reflection phase of Zimmerman (2002) might turn out to be fruitful.

4.2. Limitations

While this study was originally intended to include full randomization of students across control and experimental groups, distribution of participants over conditions was not fully random. Practical constraints (e.g., lesson schedules, multiple school locations) have led to the decision to randomize as best as we could, however not

fully. The lack of full randomization might have given opportunity for systematic bias to influence intervention effects.

Additionally, while teachers did receive uniform instructions to conduct the Talent Lessons and Talent Talks during a short training session, they did not receive any additional training. As such, the teachers in our study may not have been experienced enough in conducting Talent Talks to elicit the anticipated effects of the intervention on students' SRL skills.

Due to our focus on SRL, we have not included the transitionary period as variable of interest. If we had done so, we would have been able to gain more understanding of nature of the relationship between the transition from primary to secondary school and SRL. While that undoubtedly would have yielded valuable information, as it stands, we were able to answer our research questions. Additionally, the timing of our last data collection point might not have been ideal. As mentioned before, the scholarly field is moving toward understanding transitions as an ongoing, complex processes, rather than a normative events. This implies that postponing our last data collection point, would have given students more time to adapt to the transition and likely provide a more valid representation of the process.

4.3. Conclusion

In Dutch educational practice, many schools use Talent Lessons and Talent Talks, and among others, these are expected to have a positive effect on students' SRL skills, motivation, self-efficacy, and transition from primary to secondary education. However, empirical evidence is lacking, and the present study was not able to confirm any of these effects. Effectiveness of the intervention might be increased if Talent Talks and Talent Lessons were adapted, so that students' reflections about talents are tailored to self-regulation of specific tasks.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by The Maastricht University Ethical Review Committee Inner City Faculties. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

SB contributed data and or material. AV conducted the analyses. JB and AV wrote the first, second, third, and fourth draft. SB, TS, TG, and AB provided feedback on the first, second, third, and fourth draft. The manuscript was finalized by JB. All authors contributed to the article and approved the submitted version.

Funding

This research project was funded by the Netherlands Initiative for Education Research (NRO) under grant number: 40.5.20500.166.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

References

Alspaugh, J. W. (1998). Achievement loss associated with the transition to middle school and high school. *J. Educ. Res.* 92, 20–25. doi: 10.1080/00220679809597572

Anderman, E. M., and Midgley, C. (2004). Changes in self-reported academic cheating across the transition from middle school to high school. *Contemp. Educ. Psychol.* 29, 499–517. doi: 10.1016/j.cedpsych.2004.02.002

Baars, M., Vink, S., van Gog, T., de Bruin, A., and Paas, F. (2014). Effects of training self-assessment and using assessment standards on retrospective and prospective monitoring of problem solving. *Learn. Instr.* 33, 92–107. doi: 10.1016/j.learninstruc.2014.04.004

Bandura, A. (1994). "Self-efficacy" in *Encyclopedia of Human Behavior*. ed. V. S. Ramachaudran, vol. *4* (New York: Academic Press), 71–81.

Bannert, M., and Reimann, P. (2012). Supporting self-regulated hypermedia learning through prompts. *Instr. Sci.* 40, 193–211. doi: 10.1007/s11251-011-9167-4

Blair, C., and Diamond, A. (2008). Biological processes in prevention and intervention: the promotion of self-regulation as a means of preventing school failure. *Dev. Psychopathol.* 20, 899–911. doi: 10.1017/S0954579408000436

Boekaerts, M., and Cascallar, E. (2006). How far have we moved toward the integration of theory and practice in self-regulation? *Educ. Psychol. Rev.* 18, 199–210. doi: 10.1007/s10648-006-9013-4

Boekaerts, M., and Pekrun, R. (2015). "Emotions and emotion regulation in academic settings" in *Handbook of Educational Psychology*. eds. L. Corno and E. A. Anderman. *3rd* ed (New York: Routledge), 90–104.

Cotofan, M., Diris, R., and Schils, T. (2022). Who benefits from attending the higher track? The effect of track assignment on skill development and the role of relative age. *J. Hum. Cap.* 16, 273–302. doi: 10.1086/718462

Dewulf, L., (2009). Ik kies voor mijn talent. Het basiswerk voor talent. LannooCampus.

Dewulf, L., Beschuyt, P., Pronk, E., and Thyssen, E. (2018). Ik kies voor mijn talent. Toolbox voor jong talent. LannooCampus

Duchatelet, D., and Donche, V. (2019). Fostering self-efficacy and self-regulation in higher education: a matter of autonomy support or academic motivation? *High. Educ. Res. Dev.* 38, 733–747. doi: 10.1080/07294360.2019.1581143

Dunlosky, J., Kubat-Silman, A. K., and Hertzog, C. (2003). Training monitoring skills improves older adults' self-paced associative learning. *Psychol. Aging* 18, 340–345. doi: 10.1037/0882-7974.18.2.340

Efklides, A., Schwartz, B. L., and Brown, V. (2017). "Motivation and affect in self-regulated learning: does metacognition play a role?" in *Handbook of Self-Regulation of Learning and Performance*. eds. D. H. Schunk and J. A. Greene. *2nd* ed (New York: Routledge), 64–82.

Elhusseini, S. A., Tischner, C. M., Aspiranti, K. B., and Fedewa, A. L. (2022). A quantitative review of the effects of self-regulation interventions on primary and secondary student academic achievement. *Metacogn. Learn.* 17, 1117–1139. doi: 10.1007/s11409-022-09311-0

Feron, E., and Schils, T. (2020). A randomized field experiment using self-reflection on school behavior to help students in secondary school reach their performance potential. *Front. Psychol.* 11:1356. doi: 10.3389/fpsyg.2020.01356

Fomina, T., Burmistrova-Savenkova, A., and Morosanova, V. (2020). Self-regulation and psychological well-being in early adolescence: a two-wave longitudinal study. *Behav. Sci.* 10:67. doi: 10.3390/bs10030067

Goldstein, S. E., Boxer, P., and Rudolph, E. (2015). Middle school transition stress: links with academic performance, motivation, and school experiences. *Contemp. Sch. Psychol.* 19, 21–29. doi: 10.1007/s40688-014-0044-4

Jindal-Snape, D., and Cantali, D. (2019). A four-stage longitudinal study exploring pupils' experiences, preparation and support systems during primary–secondary school transitions. *British Educational Research Journal*, 45, 1255–1278.

Jindal-Snape, D., Symonds, J. E., Hannah, E. F., and Barlow, W. (2021). Conceptualising primary-secondary school transitions: A systematic mapping review of worldviews, theories and frameworks. In *Frontiers in Education* (Vol. 6, p. 52).

Kostons, D., Van Gog, T., and Paas, F. (2012). Training self-assessment and task-selection skills: a cognitive approach to improving self-regulated learning. *Learn. Instr.* 22, 121–132. doi: 10.1016/j.learninstruc.2011.08.004

Lippmann, M., Danielson, R. W., Schwartz, N. H., Körndle, H., and Narciss, S. (2021). Effects of keyword tasks and biasing titles on metacognitive monitoring and recall. *Metacogn. Learn.* 16, 233–253. doi: 10.1007/s11409-020-09246-4

Li, S., Zheng, J., Lajoie, S. P., and Wiseman, J. (2021). Examining the relationship between emotion variability, self-regulated learning, and task performance in an intelligent tutoring system. *Educ. Technol. Res. Dev.* 69, 673–692. doi: 10.1007/s11423-021-09980-9

Ma, X., Liu, J., Liang, J., and Fan, C. (2023). An empirical study on the effect of group awareness in CSCL environments. *Interactive Learning Environments*, 31, 38–53.

Maas, C. J. M., and Hox, J. J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology* 1, 86–92. doi: 10.1027/1614-2241.1.3.86

Martin, A. J. (2009). Motivation and engagement across the academic life span: a developmental construct validity study of elementary school, high school, and university/college students. *Educ. Psychol. Meas.* 69, 794–824. doi: 10.1177/0013164409332214

Memmott-Elison, M. K., and Moilanen, K. L. (2021). Longitudinal intra-individual and inter-individual relations between cognitive and emotional self-regulation across adolescence. *J. Youth Adolesc.* 50, 1970–1981. doi: 10.1007/s10964-021-01488-y

Meusen-Beekman, K. D., Joosten-ten Brinke, D., and Boshuizen, H. P. (2015). Developing young adolescents' self-regulation by means of formative assessment: a theoretical perspective. *Cogent Educ.* 2:1071233. doi: 10.1080/2331186X.2015.1071233

Michalsky, T. (2013). Integrating skills and wills instruction in self-regulated science text reading for secondary students. *International Journal of science education*, 35, 1846–1873.

Nelson, T. O., and Narens, L. (1990). Metamemory: a theoretical framework and new findings. *Psychol. Learn. Motiv.* 26, 125–173. doi: 10.1016/S0079-7421(08)60053-5

Panadero, E. (2017). A review of self-regulated learning: six models and four directions for research. *Front. Psychol.* 8:422. doi: 10.3389/fpsyg.2017.00422

Peistaraite, U., and Clark, T. (2020). Emotion regulation processes can benefit self-regulated learning in classical musicians. *Front. Psychol.* 11:568760. doi: 10.3389/fpsyg.2020.568760

Pennequin, V., Questel, F., Delaville, E., Delugre, M., and Maintenant, C. (2020). Metacognition and emotional regulation in children from 8 to 12 years old. *British Journal of Educational Psychology*, 90, 1–16.

Raaijmakers, S. F., Baars, M., Paas, F., van Merriënboer, J. J., and Van Gog, T. (2018). Training self-assessment and task-selection skills to foster self-regulated learning: Do trained skills transfer across domains?. *Applied Cognitive Psychology*, 32, 270–277.

Rawson, K. A., O'Neil, R., and Dunlosky, J. (2011). Accurate monitoring leads to effective control and greater learning of patient education materials. *J. Exp. Psychol. Appl.* 17, 288–302. doi: 10.1037/a0024749

Ryan, R. M., and Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* 55, 68–78. doi: 10.1037//0003-066X.55.1.68

Schunk, D. H., and DiBenedetto, M. K. (2016). "Self-efficacy theory in education" in *Handbook of Motivation at School*. eds. K. R. Wentzel and D. B. Miele (New York, NY: Routledge), 34–54.

Schwinger, M., Steinmayr, R., and Spinath, B. (2009). How do motivational regulation strategies affect achievement: mediated by effort management and moderated by intelligence. *Learn. Individ. Differ.* 19, 621–627. doi: 10.1016/j.lindif.2009.08.006

Seligman, M. E., and Csikszentmihalyi, M. (2014). "Positive psychology: an introduction" in *Flow and the Foundations of Positive Psychology*, (Dordrecht: Springer)

Tabachnick, B. G., Fidell, L. S., and Ullman, J. B. (2007). *Using Multivariate Statistics*, vol. *5*. Boston: Pearson.

Thiede, K. W., Redford, J. S., Wiley, J., and Griffin, T. D. (2017). How restudy decisions affect overall comprehension for seventh-grade students. *Br. J. Educ. Psychol.* 87, 590–605. doi: 10.1111/bjep.12166

Vandevelde, S., Van Keer, H., and Rosseel, Y. (2013). Measuring the complexity of upper primary school children's self-regulated learning: A multi-component approach. *Contemporary Educational Psychology*, 38, 407–425. doi: 10.1016/j.cedpsych.2013.09.002

Van de Pol, J., de Bruin, A. B. H., van Loon, M. H., and van Gog, T. (2019). Students' and teachers' monitoring and regulation of students' text comprehension: effects of comprehension cue availability. *Contemp. Educ. Psychol.* 56, 236–249. doi: 10.1016/j.cedpsych.2019.02.001

van de Pol, J., van den Boom-Muilenburg, S. N., and van Gog, T. (2021). Exploring the relations between teachers' cue-utilization, monitoring and regulation of students' text learning. *Metacogn. Learn.* 16, 769–799. doi: 10.1007/s11409-021-09268-6

van der Veen, I., and Peetsma, T. (2009). The development in self-regulated learning behaviour of first-year students in the lowest level of secondary school in the Netherlands. *Learn. Individ. Differ.* 19, 34–46. doi: 10.1016/j.lindif.2008.03.001

West, P., Sweeting, H., and Young, R. (2010). Transition matters: pupils' experiences of the primary–secondary school transition in the West of Scotland and consequences for well-being and attainment. *Res. Pap. Educ.* 25, 21–50. doi: 10.1080/02671520802308677

Zimmerman, B. J. (2002). Becoming a self-regulated learner: an overview. *Theory Pract.* 41, 64–70. doi: 10.1207/s15430421tip4102_2