The Professional Student Program for Educational Resilience: Enhancing Momentary Engagement in Classwork

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Keywords
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Abstract

The Professional Student Program for Educational Resilience (PROSPER) was designed to increase students' ability to stay momentarily engaged in classwork, thus promoting educational resilience. Participants (N = 277, 51% male, 74% Irish) from two low-income schools in Dublin, Ireland (School A n = 158; School B n = 119), were assessed using the intervention's theory of change: (1) change in knowledge of how to stay engaged in classwork, (2) subsequent change in momentary engagement in classwork, and (3) subsequent longer-term change in dispositions for engagement (i.e., tendency to enjoy learning). Qualitative results demonstrated that PROSPER facilitated students' knowledge, momentary engagement, and teachers' involvement with students. Quantitative analyses uncovered changes in knowledge and momentary engagement for both the higher and lower ability tracks in School A. The results give refined information on how this universal-school based program increased students' momentary engagement and supported their educational resilience.

Keywords

Momentary engagement, student engagement, motivation, resilience, intervention

The Professional Student Program for Educational Resilience (PROSPER): Enhancing Momentary Engagement in Classwork

Momentary engagement can be conceptualized as the moment-by-moment process of students engaging cognitively, behaviorally, and affectively in a task or activity, and occurs as a dynamic psychological and physiological system in context (Authors, *xxxx*; Goldin, Epstein, Schorr, & Warner, 2011). This type of engagement in classwork promotes academic attainment (Wang & Eccles, 2012) and can have longer term consequences for the educational participation of young adults (Symonds, Schoon, & Salmela-Aro, 2016). However, students can encounter barriers to staying momentarily engaged in classwork, including experiencing low-quality curricular resources; distracting peers; teachers who are emotionally unsupportive, have low expectations, or who do not promote critical and creative thinking; and being tasked with high-stakes classwork that promotes social comparisons, or is personally irrelevant or monotonous (Shernoff, et al., 2016; Symonds & Hargreaves, 2016).

Staying momentarily engaged in classwork is an important component of educational resilience, which is defined as a student's ability to perform well despite experiencing challenging circumstances (Martin, 2002). A resilient student maintains their momentary engagement by drawing on social (external) and personal (internal) resources to help stay motivated and sustain their attention in the task (Authors, *xxxx*; Skinner, 2016). An example of educational resilience in a classroom is where a student, faced with a boring English grammar task, maintains her engagement by considering the value of school for facilitating her goal of becoming a writer (utility value; Eccles et al., 1983). She might also work with her classmates to create a better classroom learning climate through co-regulation where interacting with her classmates makes the work less boring (Hadwin, Järvelä, & Miller, 2011). She might also consider how new knowledge gleaned from the grammar task could be applied to her favorite free writing task (Hidi & Renninger, 2006). Last, this student

could call on emotional coping strategies to manage her boredom during the task (Appleton, Christenson, Kim, & Reschly, 2006; Martin & Marsh, 2006; Pitzer & Skinner, 2017; Skinner, Pitzer, & Steele, 2013). In contrast, a student who does not employ these personal and social resources might resort to maladaptive coping strategies like self-pity and rumination. Such coping strategies are referred to as educational, academic, or motivational vulnerability (Martin & Marsh, 2006; Skinner et al., 2013).

In this paper, we (the researchers) describe the design, implementation, and study of an intervention for enhancing students' momentary engagement in classwork, extending our understanding of momentary engagement as a dynamic system comprising emotion, motivation, and mental and physical action (Authors, *xxxx*). Acknowledging the complexity of momentary engagement as a dynamic system and its role in educational resilience encouraged us to design the intervention to target multiple personal and social competencies (i.e., learner identity, attitudes to learning, self-perceived competence, educational and career goals, relationships for learning and attention), which students can use to sustain their engagement in classwork. A three-step theory of change was used to assess the complex developmental process of enhancing student engagement in the classroom, consisting of three phases: (1) *enhancing students' knowledge about how to stay engaged in classwork*, which should (2) *impact their ability to stay momentarily engaged while doing classwork*, and (3) *lead to the development of their self-perceptions and attitudes regarding classwork.*

Momentary Engagement in Classwork

Momentary engagement is defined as an affective-motivational state of physical and/or mental action in a task that proceeds as a dynamic system (Authors, *xxxx*). For example, when students are independently solving a mathematics problem or participating in groupwork, they are momentarily engaged in classwork. Momentary engagement begins with a trigger (for example,

being asked to solve a mathematics problem), continues as a sequence of internal dynamics among emotion, motivation, and mental and physical action, and ends with disengagement from the task (e.g., the task having been completed or the student having given up) (Authors, *xxxx*).

When a student's momentary engagement manifests as a state of complete absorption in the activity, it is conceptualized as an optimal learning moment (Schneider et al., 2016), building on the concept of 'flow' (Csikszentmihalyi, 2008). However, classroom activities do not typically promote flow experiences due to a lack of personal relevance and individually calibrated challenge for adolescent students (Shernoff, Ruzek, Sannella, Schorr, Sanchez-Wall & Bressler, 2017). Also, having students in flow is not necessarily the goal of all classroom activities, therefore broader studies of momentary engagement, such as this one, add valuable information on how students engage real time with specific learning tasks.

Momentary engagement should be understood in the context in which it occurs. For example, a student's engagement might be interrupted when another student throws paper at them, or their engagement could be optimized when they encounter challenging, varied, interesting, and rewarding lesson materials (Shernoff et al., 2016). Momentary engagement shares a dynamic relationship with students' self-perceptions (e.g., "I am good at math") and connections with others (e.g., "I have good friendships with my classmates"), which can act as facilitators for momentary engagement in context (Skinner, 2016). Daily experiences of momentary engagement can influence the development of students' personal dispositions for engagement, such as their tendency to value schoolwork, concentrate in class, and focus on what they are doing (Symonds & Hargreaves, 2016). These broader, sustained dispositions are the focus of studies of "student" or "school" engagement, where attitudes towards self and schooling, and longer term-patterns of behavior combine in an overall picture of students' psychological investment and participation in schooling (Fredericks, Blumenfeld, & Paris, 2004; Wang & Degol, 2014; Wang & Hofkens, 2019).

Methods that measure momentary engagement include eye-tracking (Miller, 2015), trace methods, think-alouds, retrospective reporting (Azevedo, 2015), and systematic observation (Hargreaves & Galton, 2002). In comparison, students' engagement dispositions and school engagement are often measured using cross-sectional or repeated measures self-report questionnaires (Wang & Degol, 2014). This study adds to the literature on engagement by measuring engagement at both the micro level of momentary engagement (i.e., in the moment observations) and the macro-level (i.e., student self-reports regarding their engagement dispositions) of students' engagement dispositions.

Building Momentary Engagement and Educational Resilience

This paper discusses three pathways to improving students' momentary engagement in classwork in the face of barriers to engagement. These are: (1) *increasing students' knowledge of how specific personal and social resources facilitate momentary engagement*; (2) *helping students develop the personal and social resources that facilitate momentary engagement*; and (3) *improving school climate.*

Because momentary engagement is dynamic, multidimensional, and context specific, students who face barriers to momentary engagement in their classwork generally respond in one of two ways: (1) either by appropriately processing, interacting, responding, and persevering in the task, or (2) by becoming less engaged or potentially disengaging from the activity. One pathway to helping students remain engaged with their classwork in the face of distractors, is to *help students build their knowledge of how to apply these resources in order to stay engaged.* If students are unaware that they can change their own engagement, then it might be that they never try.

Large scale longitudinal studies have documented a range of levels of personal resources for engagement and have demonstrated relationships between these and academic achievement (for example between academic self-concept and school grades; Archambault & Dupéré, 2017;

Susperreguy, Davis-Kean, Duckworth, & Chen, 2018). Clearly, not all students have high levels of personal and social resources for sustaining engagement, and these resources are clearly important for academic outcomes. This study presents an opportunity for teachers, school staff, and school districts to *help students develop their personal and social resources for engagement* (i.e., help student acquire adaptative classroom/school behaviors, teach students how their peers, teachers, larger school system can support their learning, and help students manage their academic emotions to keep them engaged in learning).

A third pathway for building momentary engagement and educational resilience is by *improving school climate.* School climate research from the United States observed that schools with positive academic and social climates positively impact students' attitudes towards school (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). However, schools in areas with higher poverty and crime may tend to lack positive school climates despite similar levels of academic rigor (McCoy, Roy, & Sirkman, 2013). According to Berkowitz, Moore, Astor, and Benbenishty (2016), helping students develop educational resilience in low-income schools could improve school climate by disrupting the connection between poverty and low attainment.

As our theory of change suggests, when students are aware of these resources, and actively develop and practice using them, they will likely engage momentarily in their classwork more deeply and more often. As students observe changes over time in their momentary engagement, they should develop more positive perceptions of themselves as learners and sustain more positive relationships with their teachers and peers. As a result, classroom climates should improve, which should further enhance the conditions for momentary engagement in classwork.

Program Design

We developed PROSPER in conjunction with a secondary school English teacher, with the purpose of enhancing students' momentary engagement in classwork. We followed the principles of

a research-practice partnership (Coburn & Penuel, 2016), where the English teacher helped the educational psychologists embed psychological education into standard school practice. The team jointly created activities that targeted the development and application of students' personal and social resources for sustaining momentary engagement and met the objectives of the Irish national English curriculum. The teacher's expertise also ensured that the lessons met the developmental and contextual needs of 12–14-year old students in their first year of secondary schooling in a low-income school.

The full PROSPER program consisted of 30 x 40-minute lessons, with one lesson taught each day over a six-week period (20 hours in total). Each week focused on a specific target for promoting momentary engagement in classwork. A condensed version was created by taking the first lesson in each of the six-week blocks to create a 6 x 40-minute program (four hours total). The full and condensed programs covered the same targets but at different depths.

The program has six targets designed to help students build their personal and social resources for momentary engagement and apply these to sustaining their momentary engagement during class. These targets are: (1) learner identity, (2) attitudes to learning, (3) students' levels of perceived competence, (4) educational goals, (5) peer and teacher relationships as social resources, and (6) students' levels of perceived competence to maintain attention when encountering distractors. Each target is described below. Because the program was designed using Ireland's national curriculum objectives for English, it had a dual purpose of enhancing momentary engagement and literacy. The impact on student literacy was not tested in this study.

PROSPER Targets

Learner identity. Identity is conceptualized as a person's emerging individualization (Kaplan & Garner, 2017). At school, students become more autonomous, meet new friends, and have academic and social interactions that contribute to identity formation, which significantly

impacts students' momentary engagement in classwork. Students can become more engaged when lessons confirm their identity (Faircloth, 2012) and less so if the class content does not dovetail with their identity, either developmentally or contextually. Students can learn how to use their newfound knowledge of their own identities to shape action in school contexts. For example, one PROSPER activity in identity competency asked students to use scaffolded reflections (i.e., the What? So what? Now what?) to assess how their school experiences both reflected and impacted their identities, and how their identities could help them overcome challenges at school.

Attitudes to learning. Educational attitudes are judgments or evaluations that focus on any aspect of education, for example, classwork, teachers, classmates, and schooling. Attitudes towards schooling result from everyday classroom experiences, which can lead to emotional responses including frustration, boredom and interest, and support students' developing identities (Symonds & Hargreaves, 2016). According to Borman and Overman (2004), students with positive educational attitudes can generally overcome barriers to learning and engagement. Also, Heller and colleagues (2017) found that students can choose to change their attitudes towards school if they have the will and ability to do so. Thus, educating students about their educational attitudes and their ability to control them might provide students with a useful tool to overcome barriers to momentary engagement in classwork.

Students' levels of perceived competence. Feeling competent, a basic human need, motivates people to search for stimulating and challenging experiences (Ryan & Deci, 2000). To achieve academic success, students must accept failure as part of the learning process, which is easier in classrooms that promote effort (i.e., mastery classrooms) rather than performance or social comparison (Dweck, 2006; Lin-Siegler, Ahn, Chen, Fang, & Luna-Lucero, 2016). In PROSPER, perceived competence refers to students' perceptions of how good they are at their classwork. For this target, we taught students that forming perceptions of competence by observing their classmates'

successes and failures is reasonable and has the potential to motivate (Zimmerman & Shunk, 2001). However, we also explained that their focus should be on their own learning, that they should "run their own race" (Moran, 2018, p. 90). PROSPER lessons were thus oriented at helping students identify their feelings of perceived incompetence and work past them based on their own educational goals.

Educational goals. PROSPER teaches students about educational goals using a hierarchy of readily achievable short-term goals as the foundation for long-term goals (Duckworth & Gross, 2014). Such goal setting and striving occur in the context of both daily classroom activities and long-term educational career pathways, which can include college or other professional pathways. However, students can be distracted by competing non-educational goals, like watching a younger sibling instead of doing homework if their parents cannot supervise. The PROSPER program teaches students what educational goals are and how to attain longer term goals (e.g., passing the next standardized examination) by setting shorter term goals in the context of momentary engagement with classwork.

Peer and teacher relationships as social resources. Relationships can be understood as one's interactions with another person, group of people, or social entity (Hardy, Bukowski, & Sippola, 2002). In schools, relationships can range from those among close friends and classmates to casual connections in the larger school context, such as teachers and other school staff. All these relationships are instrumental to the support system that motivates students to want to engage in school, helps them develop their educational goals, and helps build their learning skills. Sometimes students might not be aware of their social network, which can provide opportunities that support learning. The PROSPER intervention teaches students about the importance of positive relationships for learning: how to form them, how to maintain them, and how to combat negative relationships by drawing on other types of social support.

Students' levels of perceived competence to maintain attention when encountering distractors. Attention is the cognitive process of concentrating on one or more activities (or targets), while marginalizing irrelevant environmental input (Moran, 2018). Being deliberately attentive allows an individual to better retain information in their working memory, which facilitates encoding that information into long-term memory (Alloway & Alloway, 2010). Students who are attentive in class can synthesize and remember class material and achieve higher levels of interest in a subject (Hidi & Renninger, 2006). Conversely, students who are easily distracted can lose interest and become less momentarily engaged in classwork.

PROSPER was designed to help students better understand and apply their attention in classroom contexts. For example, students were asked to read excerpts where outstanding career role models described their personal techniques for sustaining attention in tasks. Students were then asked to consider the value of the role model's techniques, for example, keeping their smart phone on airplane mode to prevent getting distracted by notifications while doing homework. To develop their understanding of attention and practice it, students participated in roleplays where one student was the voice in the head of the other student, telling them how to ignore distractors and concentrate more deeply on their work, while another student gently distracted them. This activity and others in the attention section aimed to help students draw on the other five targets of personal and social resources to sustain their momentary engagement in the face of barriers to attention. According to Yeager and colleagues (2014), students who can regulate their attention during boring tasks are more likely to be engaged during lessons and become resilient learners. The skill involved in developing a greater sense of attention is also transferable from school to other contexts.

Adult Role Models

All the lessons were based on a set of biographical statements collected for the PROSPER program through interviews with nine Irish outstanding career role models who had overcome

challenges to succeed in their education and lives (see Table 1). According to Wilson (2011), using role models in an intervention to "emphasize positive aspects of one's group" (p. 223) can have positive psychological effects on the participants. Adult role models are key to young people's perceptions of education and can influence how they engage in school. For instance, one role model, a former mixed martial arts fighter forced into early retirement due to a heart condition, explained how he negotiated his disadvantaged childhood and overcame the hardships of early forced retirement. Another role model, a female scientist who gave birth at age 15, worked as a cleaner before earning a PhD and establishing her own biomedical laboratories at two distinguished universities. The role models also contributed pieces of creative, instructional, and persuasive writing that were used to construct several PROSPER activities.

[insert Table 1]

Diverse Pedagogies

The PROSPER lessons were designed using five mechanisms for learning: *active learning* (i.e., participating deliberately in course content; Moreno & Mayer, 2000)*; social cognitive learning* (i.e., learning from interactions with one's environment; Bandura, 2001)*; reflection on competencies* (i.e., reflecting on oneself as a student and one's learning; Zimmerman & Shunk, 2001); *inoculation against setbacks* (i.e., practicing coping with potential psychological threats; Akkermans, Brenninkmeijer, Schaufeli, & Blonk, 2015)*;* and *skills transfer* (i.e., learning that can be applied in multiple contexts; Bandura, 1997). These pedagogies were based on an earlier intervention by O'Sullivan, Symonds, and Akkermans (2018) for motivating socially disadvantaged young people to participate in education and employment.

Theory of Change

As previously mentioned, the theory of change underpinning PROSPER assumed that the lessons would: (1) lead to a change in students' knowledge of their personal and social resources for

engagement and how to use these to sustain their momentary engagement in classwork, which would (2) lead to improved individual momentary engagement in learning, which would (3) create the conditions for students to enhance their engagement dispositions (e.g., their enjoyment of doing classwork). (A future study will examine how strengthening this process can lead to improvements to classroom and social climate.) This theory of change provided the model for implementing PROSPER in low-income schools and structured our understanding of how the program can impact students' ability to stay momentarily engaged in their classwork.

The Current Study

Previously, components of momentary engagement have been enhanced by school-based interventions, including sustaining selective attention (Waters, Zimmer-Gembeck, Craske, Pine, Bradley, & Mogg, 2016), creating learning goals and strategies (Cleary & Zimmerman, 2004), and regulating emotions (Nathanson, Rivers, Flynn, & Brackett, 2016). However, no intervention has combined these approaches to target a wider range of social and personal resources that students can use to sustain their momentary engagement in classwork. Because PROPSER is a novel intervention and was designed to enhance students' educational resilience in low-income schools by helping students develop and apply multiple resources and competencies necessary for sustaining momentary engagement in classwork, our first research question asked:

- *Which qualities of PROSPER did students and teachers in the low-income schools think were the most and least effective?*

Because we were also interested in learning whether PROSPER impacted students' knowledge, behavior, and dispositions as outlined in our theory of change, our second research question asked:

- *Did PROSPER in its pilot phase impact students' ability to stay momentarily engaged in classwork?*

By addressing both questions in the analysis, we provided information on (1) the mechanisms by which PROSPER might have influenced students' psychology and behavior and (2) observed influences on students' psychology and behavior.

Materials and Methods

The PROSPER Study

Participants. Participants were enrolled in two public schools with a Delivering Equality of Opportunity in Schools (DEIS) classification given by the Irish Department of Education and Skills. Students attending DEIS schools often come from areas of social and geographic disadvantage and face barriers that can lead to poorer health and economic outcomes (Department of Education and Science, 2005). Both schools in the study were mixed gender secondary schools[1] with approximately 500 students each. PROSPER was administered by classroom teachers as a full program of 40 lessons in School A (*N* = 158, female = 45%, age range = 12–16 years, *M* age = 12.7 years old, Irish ethnicity = 85%, other European = 5%, other international = 3%, mixed Irish/other = 6%, indigenous Traveler = 1%) and as a condensed program of six lessons in School B (*N* = 119, female = 56%, age range = 12–15 years, *M* age = 12.9, Irish ethnicity = 59%, other European = 14%, other international = 5%, mixed Irish/other = 20%, traveler = 2%).

We designed the study to be a delayed control-group pretest – post-test design, where in both schools the experimental group received the intervention one term earlier (at the beginning of the fall semester) than the control group (at the beginning of the spring semester). In School A, first-year students were the experimental group and second-year students were the control group. Random assignment was not possible in this school; thus, a quasi-experimental design was used. In School B,

[1] The equivalent of a secondary school in the United States would be the combination of a middle (7th and 8th grade) and high school (9th–12th grade).

first and second-year students were randomly assigned to either the experimental or control group. More details about the procedure can be found below.

An additional grouping variable of ability track (i.e., low, moderate, high) was available for School A, whereas classes in School B were mixed ability. The study received ethical approval from the human research ethics committee of our university, and consent to participate in the study was collected from students, parents, and teachers.

Procedures and Design

Teacher training. Before implementing the program, teachers were introduced to the PROSPER manuals, aims, and techniques in a three-hour workshop. Teachers were asked to read the PROSPER manual, discuss their observations in a group, and raise questions about the program with the trainer. Individual activities were reviewed, and teachers were positive about teaching the program, enthusiastic that it was designed by one of their colleagues, and excited about using innovative teaching materials. During the implementation of the full program, the first author visited the classrooms regularly and gave support to the teachers as required. To assist teachers, all manuals were written with highly detailed instructions on program delivery. The three hours for teacher training had the additional goal of learning whether teachers could deliver the program through a series of webinars or online trainings.

Timeline. Table 2 outlines the study timeline and procedure for PROPSER.

School A (full program) timeline. Experimental and control groups were assigned based on class year in School A, where first-year students (the experimental group) received PROSPER at the beginning of the school year, and second-year students (the control group) received PROPSER during the beginning of the second term. This was because it was not possible to employ random assignment in this school. Pre-tests to assess students' psychological dispositions for school were given to both groups in September at the beginning of the fall term, then the experimental group

received PROSPER, and finally the dispositions post-test and the knowledge change quiz were given to both groups in November. In January following the break between the first and second terms, students were given a standardized lesson activity (see below for more information) which was used to assess their momentary engagement. Finally, in February, the second-year group received the PROSPER intervention.

School B (reduced program) timeline. In School B we were able to randomly assign first- and second-year students to either the experimental or control groups. The evaluation and implementation of the reduced version of PROPSER occurred during the second term, except for the pre-tests to assess students' psychological dispositions for school and the knowledge change quiz, which were administered in December at the end of the first term. After the break between the first and second term, the experimental group received the reduced version of PROSPER. Also, during this time, both the experimental and control group participated in the standardized lesson activity used to evaluate momentary engagement. In March following the first PROSPER intervention, both groups took the dispositions and knowledge change post-test. Last, in April, the control group participated in reduced version of PROSPER.

Materials

Qualitative materials. Following the intervention, four focus group interviews (five x six students each) were conducted in School A with students in the experimental group. Questions assessed the six targets and students' overall momentary engagement, focusing on the theory of change and the possible facilitators and barriers of participating in PROSPER. Four teachers from School A (three female and one male) were also interviewed individually to understand their perceptions of the facilitators and barriers associated with teaching the full program. Student focus group questions included "PROSPER is something you recently experienced at school. Can you tell me how you felt about your lessons at school, before you had the PROSPER lessons?," "How do

you feel about your lessons at school, after participating in the PROSPER program?," and "What did you like most/least about the PROSPER program in class?" Teacher interview questions included "What were your experiences of teaching PROSPER?," "While you were teaching PROSPER, what did you find most useful/problematic?," and "What type of lesson activity did you find worked the best?"

Quantitative materials. We designed measures to elicit information matching the three components of change: *knowledge about personal and social resources for engagement*, *momentary engagement*, and *engagement dispositions* (see Table 2 for a detailed timeline of the intervention implementation for both schools). Knowledge change was measured at post-test for School A and at pre- and post-test for School B, due to differences in the timing of the development of our knowledge change measure. Behavioral change was measured once at post-test for both schools. Disposition change was measured at pre- and post-test for both schools through self-report.

Knowledge change. We designed a 12-item true/false quiz to assess changes in students' knowledge (i.e., concepts; Dole & Sinatra, 1998) regarding the six PROSPER targets. Based on the notion that conceptual change occurs with the move from a "misconception to a scientifically accepted conception" (Heddy, Taasoobshirazi, Chancey, & Danielson, 2018, p. 1), the false items were presented as common misconceptions and true items as correct conceptions. The total quiz score (0–12) was used in the analysis. Sample questions included: "The attitude of one student can impact the learning of all students in the class (True)," "People can pay attention no matter how boring the work is (True)," and "People waste their time trying hard in activities they are not talented at (False)."

Momentary engagement change. To assess momentary engagement, we gave students a monotonous English grammar task that tested their ability to deliberately invoke and sustain their momentary engagement across a 10-minute time window. We created a worksheet similar to those

students might have found in their grammar books. The worksheet contained four activities: prepositions, punctuation, homonyms, and clauses. Students were instructed to do the worksheet like any normal English lessons, and to finish as much as they could in 10 minutes. The task was administered by the first author for all classes, while the co-first author video recorded the students from the front of the room. Immediately following the task, students were asked to complete the record of experience (RoE) survey (Shernoff et al., 2016). A total of 13 classes were involved across the two schools. During the focus group interviews that followed, students confirmed their familiarity with similar activities and that they found them boring.

Selected RoE items were then used to construct two variables tapping into the psychological components of momentary engagement: momentary emotion/motivation and momentary mental action. Items assessing momentary emotion/motivation were "Did you enjoy what you were doing? Was it interesting?," and "How important was this activity topic to you?" Items assessing momentary mental action were "How hard were you trying?," "Were you using a high level of skill?," "How hard were you concentrating?," and "Was it challenging?" All items were measured on a five-point Likert type scale from 1 (not at all) to 5 (very). Mean scores of the two dimensions were used in the analysis. Reliability statistics are presented in the data analysis section.

Next, a momentary physical action variable was created using systematic observation of the 13 lessons. The lesson videos were viewed by trained research assistants who coded the behavior of individual students into the 12-item Pupil Record Schedule (PRS) adapted from Hargreaves and Galton (2002). Individual student behavior was coded every 30-seconds for 10 minutes for a total of 20 intervals. Scores in four codes indicating students' on-task behaviors were summed to represent momentary mental action. These codes were *cooperating fully on task alone*, *cooperating fully on task with a friend*, *waiting for the teacher*, *paying attention to the teacher*. Inter-rater coder reliability was checked by comparing agreement across 20% of case between the first author's codes

and the group of trained research assistants coding independently of each other at the 0.5 (83% agreement), 5.5 (81% agreement), and 9.5 (75% agreement) minute intervals representing the start, middle, and end of the time window.

Disposition change. We measured two engagement dispositions related to students' momentary engagement: (1) students' dispositional emotion/motivation (i.e., "I enjoy learning in class; What we are learning in school is interesting"; and "I think that school is important for achieving my future life goals"); and (2) students' dispositional mental and physical action (i.e., "I can concentrate on one activity for a long time, if I need to"; "If I am distracted from an activity, I can quickly come back to the topic"; and "If an activity makes me feel frustrated, anxious or angry, I can calm myself down so that I can continue with the activity"). All items were presented on six-point Likert scale from 1 (not at all) to 6 (all of the time). Emotion and motivation disposition items were taken from Pekrun's (2011) Achievement Emotions Questionnaire (AEQ) and Pintrich's (1990) Motivated Strategies for Learning Questionnaire (MSLQ). Mental and physical action disposition items were taken from Schwarzer et al.'s (1999) Self-Regulation Scale. These items and variables mirrored the momentary emotion/motivation and mental action variables.

Data Analysis Procedures

Qualitative analysis procedure. We analyzed interview data using thematic analysis, where text segments are ascribed a broader meaning by the researcher (coding) and systematically organized into upper level themes (Clarke, Braun, & Hayfield, 2015). First, deductive analysis was used to code the transcripts of student and teacher interviews into the categories of barriers and facilitators of PROSPER, and the student interview transcripts into the categories of knowledge, behavioral, and self-system changes. These two sets of deductive categories aligned with the research questions. Next, the statements within each category were coded inductively to identify themes and subthemes emerging from participants' responses. Here, line by line coding was

employed to develop the initial thematic structure, then initial themes were revised and grouped into more comprehensive themes as coding was carried out with successive transcripts. A final reading of all transcripts checked the utility and exhaustive qualities of the themes developed. The initial coding was conducted by the first author, then reviewed by the second author for consistency with the original data presented in the transcripts. The two authors discussed the initial codes and resultant themes in relation to the literature on adolescent development and school engagement, to ensure that the codes had both ecological validity and theoretical relevance.

Quantitative data analysis procedure. All cases with scores on the cross-sectional measures were used to analyze knowledge and momentary engagement changes (School A: quiz; School A and B: on task behavior, momentary emotion/motivation, and momentary mental action). Also, cases with scores on the longitudinal measure were used to analyze disposition changes (School A and B: dispositional emotion/motivation and dispositional mental/physical action).

Missing data. The set of study variables was analyzed for missing data patterns. In School A, according to Little's MCAR test (X^2 (472) = 471.07, p = .503), data were missing completely at random (MCAR; missingness ranged from 23% to 2%). In School B, Little's MCAR test (X^2 (295) = 351.33, p = .013) revealed that data were not missing completely at random (missingness ranged from 0% to 37%). To handle the missing data, we used the impute dataset function on SPSS 24 to impute five datasets. The five datasets imputation option is the default option on SPSS, and according to van Ginkel and Kroonenberg (2014) is a sound method for the purpose of this analysis. Following the imputation of the five datasets, pooled variables were created by taking the mean of each item on the five imputed datasets. Scales were then created using the pooled variables. T-tests were used to test for statistical differences between our original missing data and pooled variables. No statistical differences in means or variances were found between the original items and the pooled items.

Reliability analysis. Following the data imputation, reliability analyses were conducted for the pooled data. Reliabilities for School A are as follows: momentary emotion/motivation (α = .81) and momentary mental action (α = .63), dispositional mental/physical action (time 1 α = .75; time 2 α = .76), and dispositional emotion/motivation (time 1 α = .79; time 2 α = .74). Reliabilities for School B are as follows: momentary emotion/motivation (α = .76), momentary mental action (α = .65), dispositional emotion/motivation (time 1 α = .63; time 2 α = .63), and dispositional mental action (time 1 α = .72; time 2 α = .84).

Analysis plan. The knowledge variable was analyzed for School A with a univariate analysis of variance (ANOVA) due to the absence of a pretest; and for School B with a univariate analysis of covariance (ANCOVA) to control for pretest. Change in momentary engagement was analyzed for both schools using a multivariate analysis of variance (MANOVA) to assess the on-task, momentary emotion/motivation, and momentary mental action variables collected at post-test. Change in engagement dispositions was analyzed for both schools using ANCOVAs to assess self-system emotion/motivation and mental action, controlling for pretest. The interaction between ability track and treatment group was included in all models for School A.

Results

Results are organized under the relevant research question. Summaries of the qualitative themes are in Tables 3, 4, and 5; descriptive statistics in Tables 6 and 7; correlation matrices in Tables 8 and 9; and significant inferential models and Bonferroni post-hoc analyses in Tables 10 and 11, respectively.

Research Question 1: Which qualities of PROSPER did students and teachers in the low-income schools think were the most and least effective?

Facilitators of student learning. In the student focus group interviews, five themes addressing facilitation were found (see Table 3): (1) *general interest/enjoyment in PROSPER*; (2)

enjoyment of *specific curricular content associated with PROSPER*, including the role models, active learning, and easy activities; (3) perceptions of greater *teacher effectiveness* when teachers employed interactive pedagogy; (4) *less pressure on students*, where PROSPER's focus on incremental learning was attributed to lower student stress levels; and (5) *identity development* facilitation, through the program role models. In total, 70% of the coded statements for Research Question 1 regarded facilitators, rather than barriers of learning, for students (see Table 3).

During the interviews, three students explained that PROSPER was fun and that they would "rather do PROSPER than do *Fire and Ice* (the standard English text)." The role models' descriptions of their experiences also resonated with the students. One student explained, "You remember things about Richie Sadlier [a former Irish soccer player] and Paddy Holohan [a former mixed martial arts fighter] and what they did to be where they are now and that's the type of things that you learn, but you wouldn't learn that in Fire and Ice [the English textbook]. You would learn what vowels are."

Barriers to students' learning. From the student interviews, four themes emerged: (1) *Issues with PROSPER content*, including limited role model diversity, manual design, and assignment difficulty; (2) *issues with teachers*, including how PROSPER's success depended on teacher engagement and talent; (3) *issues with content*, including a general dislike of the program or specific assignments; and (4) *discontinuity with the program*, including concerns about lack of organization, student grouping by ability, and teachers' inconsistent approach.

Students' responses suggested that these barriers were subjective for individual students, rather than being a group-wide reflection on the program. For example, one student explained that he preferred working alone while another said she preferred working in groups. Others commented on the role-playing activities, one finding them "just embarrassing" and another lamenting the gender

inequity in role model selection with only two of the nine role models being women. This highlights the individual nature of reasons for disengagement and dissatisfaction.

Facilitators of teaching PROSPER. From the teacher interviews, six themes emerged describing how PROSPER had facilitated student learning (see Table 4). The first theme suggests the academic benefits of the (1) *PROSPER content,* with subthemes of engaging, high-quality activities teaching wellbeing across the curriculum, the workbook design, role model effectiveness, and the program's age appropriateness. Themes two through six consisted of: (2) *expanding PROSPER* into other curricular areas; (3) *building relationships with students*; (4) *student engagement in school and at home because of the program*, especially for lower-ability students; (5) *development of teaching effectiveness through integrating theory and practice*; and (6) *enjoyment of PROSPER by both teachers and students.*

One of the teachers in charge of teaching the lowest ability track second-year group explained that she liked PROSPER because, "Some of the paired work worked well," which meant that students were able to engage better during smaller group activities. Another teacher explained, "When they [the students] got to watch the videos they really liked that, and I think that led to more discussion." In this case, the teacher explained that students were able to engage better and enjoyed the audio/visual components of the program.

[insert Table 2]

Barriers to teaching PROSPER. Four themes suggested that teachers thought PROSPER created barriers to students' learning. These were: (1) *issues with program design,* including program length, role model choice, and repetitiveness of some programs; (2) *students' inability to engage in the program,* due to the mismatch between some program content and language, and students' lower academic backgrounds; (3) *PROSPER as an unsustainable program,* due to the lack of plan to continue offering PROSPER after the intervention was over; and (4) *a lack of advance*

training on how to teach the program, which was valuable information for examining the feasibility of the three hour training approach.

One teacher who worked with the lowest ability track students explained, “There were some in my class who wouldn't even engage with paired work. No matter how much I tried to encourage them.” Furthermore, one teacher explained that the active learning approach was “lost on me,” which resulted in her simply giving students the workbooks to complete without discussion following each assignment. For this research question, 42% of teachers’ references referred to barriers, and 58% to facilitators (Table 4).

[insert Table 4]

Research Question 2: Did PROSPER in its pilot phase impact students’ ability to stay momentarily engaged in classwork?

Qualitative data on knowledge change. Data from the student focus group interviews were coded into five themes referring to knowledge change (see Table 5): (1) *relationships/respect of others,* PROSPER’s impact on students’ understanding of their relationships with peers and teachers at school; (2) *motivation,* including understanding goal-setting and having a growth mindset; (3) *choosing one’s attitude*, student’s knowledge of their ability to determine their responses to environmental stimuli; (4) *self-regulation*, students’ understanding of self-regulation skills, such as planning and staying focused during a task and evaluation of their performance after a task; and (5) *facilitating identity development,* which referred to gaining knowledge about their identity/personality.

During the interviews, students indicated that PROSPER had impacted their knowledge by saying, “That [PROSPER] was about yourself and reevaluating yourself.” A third student explained, “It [PROSPER] can make us do better in reading and spelling, and we think about how we can do better.” One student explained, “You [can] be, like, whatever you want if you put your mind to it.”

In total, 78% of students' references for this research question were coded into knowledge change (see Table 5).

Qualitative data on momentary engagement change. In terms of momentary engagement changes, three themes emerged: (1) *mental-action,* includes encompassing observable changes in reflection, concentration, and regulation of emotions attributed to PROSPER; (2) *motivation*, referring to how PROSPER encouraged students to persist in the face of boredom and social comparisons, and (3) *respect for others*, where students reported that PROSPER helped them learn to respect others while doing classwork.

In regard to engagement in classrooms, one student explained, "Everyone respects their [classmates'] opinions. So, like, if you say something, nobody will be, like, I don't agree with that." A second student explained, "You have to keep on pushing through your work. There were people [role models] that weren't giving up on their work and all that. And they were fighting for it." In other words, PROSPER taught these students the value of how motivation can be applied to overcome difficult situations. This category contained 20% of students' references (see Table 5).

Qualitative data on change in engagement dispositions. Student responses focused on conceptual and momentary engagement changes as immediate impacts of PROSPER, which was unsurprising since students were interviewed only a few weeks after completing PROSPER. Thus, only the theme of "facilitating competency change" was coded as a disposition change. Here students explained that the role models helped them feel that they could succeed in life. Two references were coded into this category (see Table 5).

[insert Table 5]

[insert Tables 6, 7, 8 & 9]

Quantitative data on post-test knowledge. Descriptive statistics for all study variables are displayed in Table 6. Following recommendations from the American Statistical Association (ASA)

(Wasserstein, Schirm & Lazar, 2019) and as reviewed by Schreiber (2019), p values are used descriptively in the tables and our results are interpreted primarily based on the test statistic rather than on a probability statistic which has little utility with non-representative samples.

In School A, there was a main effect of control/treatment group on post-test knowledge ($F(1,153) = 4.68$, $p = .032$, $\eta_p^2 = .03$), with the treatment group ($M = 6.34$, $SD = 1.85$) scoring higher than the control group ($M = 5.72$, $SD = 1.91$). This finding shows that treatment group scored significantly higher on the post-test knowledge change measure than the control group. In other words, PROSPER appeared to have helped students obtain knowledge about how to engage more deeply in their schoolwork. There were no notable differences in post-test knowledge between control and treatment groups for School B.

Knowledge by ability track in School A. There were no notable differences between the three ability groups (high, moderate and low) in knowledge. However, there was a significant interaction of control/treatment within the ability groups ($F(2, 153) = 3.28$, $p = .04$, $\eta_p^2 = .04$; see Table 11). Follow up simple effects analyses showed that the low ability track treatment group ($M = 6.98$, $SD = 1.86$) scored higher than the low ability track control group ($M = 5.42$, $SD = 1.97$; see Table 12). The low ability track treatment group ($M = 6.98$, $SD = 1.86$) also scored higher than the moderate ability track treatment group ($M = 5.52$, $SD = 1.62$; see Table 12). This finding suggests that students in the lower ability track who were in the treatment group possibly benefited from PROPSER more than students in the moderate ability track treatment group and the lower ability track control group.

Quantitative data on momentary engagement change. There was no notable impact of the intervention between the main control/treatment groups for Schools A and B, for momentary engagement. However, when momentary engagement was examined by ability tracks in School A, the impact of the intervention could be observed.

Momentary physical action by ability track in School A. Momentary physical action varied across the ability tracks ($F(2,153) = 2.89$, p = .010, $\eta_p^2 = .05$). There, the low ability track (M = 14.26, SD = 4.09) scored higher than the moderate ability track (M = 10.49, SD = 5.67), and the high ability track (M = 17.59, SD = 2.92) scored higher than the moderate and low ability tracks (see Table 12). In terms of momentary physical action, the lower ability track again scored higher than moderate ability track, demonstrating that the lower ability track was more engaged during the standardized task. As expected, the high ability track scored higher that the lower and moderate ability track on momentary physical action.

There was also a significant interaction of control/treatment group on momentary physical action within the ability tracks ($F(2,153) = 9.263$, $p = < .001$, $\eta_p^2 = .10$; see Table 11). There, the high ability track treatment group (M = 17.59, SD = 2.92) scored higher than the high ability track control group (M = 13.80, SD = 5.69; see Table 12). This finding shows that students in the high ability track treatment group scored higher than the high ability track control group, which could give credence to PROSPER's ability to increase students' momentary physical action even in higher ability groups.

Momentary motivation/emotion by ability track in School A. There was no notable difference in momentary motivation/emotion between the ability tracks, nor within ability tracks in relation to the intervention.

Momentary mental action by ability track in School A. Similar to motivation/emotion, there was no notable difference in momentary mental action between the ability tracks. However, a significant main effect of the intervention within the ability tracks ($F(2, 153) = 5.91$, $p = .003$, $\eta_p^2 = .07$; see Table 11). There, the moderate ability track control group (M = 3.48, SD = .67) scored higher than the moderate ability track treatment group (M = 2.90, SD = .65; see Table 12). This

result may reflect measurement error or inherent differences in engagement between the groups that was not attributable to the intervention.

Quantitative data on change in engagement dispositions.

No significant change in engagement dispositions were observed for Schools A and B, across the whole sample when compared by treatment/control groups.

Engagement dispositions by ability track in School A. Here, the ANCOVA revealed a significant main effect for ability track ($F(2,152) = 4.36$, $p = .014$, $\eta_p^2 = .05$) for *dispositional mental action* (see Table 11). Follow-up simple effects analyses showed that the low ability track control group ($M = 4.21$, $SD = 1.04$) scored higher than the moderate ability track control group ($M = 3.97$, $SD = 1.17$; see Table 12) on dispositional mental action. Similar to our result for momentary mental action, there may have been inherent group differences operating here that were not attributable to the intervention.

[insert Tables 10, 11 & 12]

Discussion

Student's momentary engagement in classwork is essential for flourishing academically in school. The PROSPER intervention was created to build students' ability to momentarily engage with their classwork and to facilitate educational resilience in two low-income schools. This study addressed two research questions: (1) *Which qualities of PROSPER did students and teachers in the low-income schools think were the most and least effective?* and (2) *Did PROSPER in its pilot phase impact students' ability to stay momentarily engaged in classwork?*

The first key finding was that students and teachers clearly identified parts of PROSPER as facilitators and barriers, which justifies revising and continuing the program. Much of the feedback from teachers and students was positive, referring more often to facilitators rather than barriers. The barriers that emerged could be addressed through program redesign.

The second key finding revealed positive qualitative changes in students' knowledge and momentary engagement in relation to the intervention, demonstrated through students' descriptions of the program's impact on themselves and others. The quantitative data confirmed these changes under certain conditions, demonstrating an effect of the intervention on students' thinking regarding the concepts taught in PROPSER and momentary physical action on a standardized task.

Furthermore, the treatment condition scored higher than the control condition in the low-ability track on the knowledge quiz, suggesting that lower-ability students may benefit more than higher-ability students from changing their beliefs about certain psychological processes. Thus, PROSPER could have had a positive impact on these students' initial knowledge about engagement competencies and resources for engagement.

The last key finding was that there were no notable changes in engagement dispositions during the period of study. This might have been expected given that the brief six-week intervention, with measures were taken at pre- and post-test. According to Zimmer-Gemback and Skinner (2016), psychological dispositions such as perceptions of self-competence and tendency to be emotionally well-regulated are likely to develop gradually over a longer period.

Effect Sizes

It is also necessary for us to discuss specific effect sizes for the main findings related to knowledge change and momentary physical action. First, the effect of the knowledge change model where the low ability track treatment group scored higher than the low ability track control group was η_p^2 = .04 (a small to moderate effect size, Richardson, 2011). Second, the momentary physical action model demonstrated a small to moderate effect (η_p^2 = .05), and follow-up simple effects analyses demonstrated that the high ability track group scored higher compared to the low/moderate ability track group. We also found a moderate to large effect (η_p^2 = .10) for the interaction model

between the treatment/control and ability group on momentary physical action where, as expected, the high ability track treatment group scored higher than high ability track control group.

For the first iteration of PROSPER, we expected to find moderate effects that followed our theory of change. In subsequent, revised versions of PROSPER, where all stakeholder (researchers, teachers, and school administration) have a more knowledge of the facilitators and barriers of the program, we would anticipate increases in effect sizes on knowledge change and momentary physical action.

Facilitators and Barriers to Learning and Teaching

Facilitators. In line with prior research, the qualitative analysis demonstrated that the program's use of successful role models who overcame struggles (Wilson, 2011), active learning (Prince, 2004), a pedagogical approach that encouraged student voice (Rudduck, 2007), and systematic changes through an innovative program design acted as facilitators to learning and teaching. Students explained that PROSPER's focus on active learning was a welcome shift from their normal English curriculum, with tedious individual reading and answering comprehension questions. Teacher feedback from interviews explained that the PROSPER workbooks scaffolded lessons, allowed students to create their own reflections and feedback, think critically about their responses and feedback, and opened the class to group discussions. These features, according to Imbrenda (2016), are essential components of interactive, engaging pedagogy. To quote one student, "with PROSPER you learn something, and then we all discuss it."

Barriers. While teachers were pleased with the role models and active learning elements of the program, they requested more training in order to deliver the program more effectively. According to the teacher interviews, such training should focus not only on pedagogy, but also on principles of educational psychology. According to Slavin (2003), understanding and using the theories underpinning educational psychology are essential for effective teaching and student

engagement. We designed the PROSPER program to have constructivist elements, a departure from the normal English curriculum. PROSPER, for example, encourages students and teachers to participate in reciprocal teaching (Palincsar & Brown, 1984), where the teacher models what questions to ask after listening to a role model interview; then after listening to the interview, allows groups of students to summarize the interview and discuss how they could apply the lessons from the interview to their own lives. Finally, the teacher reassembles the small groups as a larger group to report on their small group discussion. Some teachers who were more accustomed to using traditional lecture-style pedagogy were uncomfortable with the student engagement element required by PROSPER. While active learning is now a standard pedagogical practice, more seasoned teachers may not be comfortable with this type of pedagogy despite training and extensive detail in program materials.

Thus, programs such as PROSPER, which aim to support student outcomes through active learning, may suffer from uneven implementation when researchers and the teachers have different student learning goals. Thus, researchers must be systematic when implementing a new curriculum so that it can meet the objectives of the school, the teachers, and the researchers (Gutman & Schoon, 2015). This manuscript has shown that effectively implementing a program like PROSPER demands significant in-person or online teacher training.

Knowledge and Momentary Engagement Change

In the focus group interviews, students reported that PROSPER helped them to develop their motivation to succeed, improved their ability to fight through failure, taught them to respect their classmates, and helped them to remain engaged when they were bored with their classwork. Students also mentioned that PROSPER led them to be more metacognitively aware and use self-control during certain activities in school. These findings were mirrored by the quantitative data for the school receiving the full program, where knowledge change was evident for students in the treatment

condition, especially those in the lowest ability track. Similarly, greater on-task behavior was found for those in the high ability track.

Like the intervention of Lin-Siegler and colleagues (2016) designed to change low-performing and underprivileged students' conceptions about sciences using stories about Albert Einstein, Marie Curie, and Michael Faraday, who triumphed over adversity, PROSPER increase the psychological skills necessary to build students resilience by using role models. As one student in PROSPER explained, "Like, you remember things about Richie Sadlier and Paddy Holohan and what they did to be where they are now and that's the type of things that you learn."

Likewise, increases in knowledge for the lowest-ability track is a significant finding and aligns with powerful interventions like the Becoming a Man (BAM) intervention in Chicago, Illinois, designed to help at-risk youth reconceptualize and slow down their thinking after being provoked (Heller et al., 2017) and the recent National Study of Learning Mindsets (Yeager et al., 2019). Like BAM, PROSPER used active learning, for example, having students participate in roleplays to find solutions to problems negative impacting one's schooling and to enhance their ability for reflection. Here, we employed active learning strategies which might have impacted learning for students on the lower ability track.

Implications for Teaching and Learning in the K-12 Classroom

PROPSER is a novel curricular resource for teachers that is designed to encourage students' momentary engagement in classwork and the longer-term development of students' engagement dispositions. It has two core design components: (1) context specific role-models that students can relate to; and (2) active learning activities. Both design components are used to help students learn about and practice using their momentary engagement competencies (e.g., attention, motivation, emotion, relationships for learning, etc.,) in classrooms.

As Faircloth (2012) explains, having materials that match students' identities as learners and as people who exist outside of school is crucial for student engagement. This requires teachers and school staff to have an intimate understanding of the larger systems (Bronfenbrenner, 1992) that play a role in students' lives. In the current study, the students and teachers interviewed explained that the normal Irish English curriculum showed discontinuity with students' identities. In their comparisons, PROSPER successfully connected students' identities to the lesson material with its focus on role model experiences and active learning.

Teachers of adolescent students could translate these two key design components to many different types of lesson activities to help their students engage more deeply in their learning and move from situational to personal interest (Hidi & Renniger, 2006) in the lesson content. In addition, teachers can freely access and adapt the PROSPER materials for school teaching and other non-commercial purposes. The PROSPER manuals for students and teachers can be downloaded from the publications page of the Engagement in Learning, Schools and Societies Lab: www.elsslab.com.

Limitations

The current study is not without its limitations. First, the knowledge change quiz in School A did not feature a pretest. We developed this measure as a result of feedback during conference presentations on the preliminary research. Although we saw differences between groups on this quiz at post-test in School A, these results must be interpreted with caution. Another limitation is that PROSPER was run in different terms in the two schools. Students' adaptation to their new secondary schools follows a series of phases, as the phase of encountering new peers, teachers and classroom settings during the first term subsides into a more stable adjustment phase in the second and third terms (Symonds & Galton, 2014). Accordingly, the full and condensed versions of PROSPER might have had more similar effects had they been given during the same school term. Unfortunately, one of the initial schools recruited for the reduced program dropped out after a new principal was

appointed at the start of the school year. We were unable to recruit School B until the middle of the first term, leaving only the second and third terms to deliver PROSPER. The similar characteristics between Schools A and B, i.e., location, size, age-range, mixed gender and DEIS classification, nonetheless enabled viable comparisons between the full and condensed treatment scenarios.

Conclusions

The current study offers three important contributions to the current research on momentary engagement, educational resilience, and engagement interventions. First, participating in PROSPER was related to increases in engagement knowledge and momentary engagement for students in the high- and low-ability tracks in the school that received the full six-week intervention. This critical finding it demonstrates that a universal school-based training program focused on core competencies for empowering momentary engagement helped students engage physically, motivationally, emotionally, and cognitively at school. This supports further research on momentary engagement as a mechanism to promote adaptive learning outcomes.

Second, implementing PROSPER with the key ingredients of local outstanding career role models, psychosocial competencies education, and a suite of established pedagogies allowed students to engage more effectively with their English curriculum. These findings provide evidence to support revising and scaling up PROSPER for additional students and schools both in Ireland and internationally.

Last, this study adds to the quickly expanding work on dynamic systems research in the field of educational psychology. The program's use of multiple competencies positioned as resources for students to increase their momentary engagement demonstrates a complex method of intervening to promote positive student outcomes. Future research is needed to ascertain whether this type of holistic program is more or less effective than programs with narrower targets, and which

components of the program can lead to the most effective outcomes for momentary student engagement.

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Tables

Table 1. *Description of role models*

Role model	Gender	Qualities for PROSPER
Aoife McLysaght	Female	Female Professor of Genetics
David Norris	Male	Male Senator (politician) and human rights activist
Emmet Kirwan	Male	Poet/Actor/Playwright
Eugene O'Shea	Male	Male Managing Director of Walls Construction
Lydia Lynch	Female	Professor of Immunology and Biochemistry
Matthew Nevin	Male	Artist/Art gallery director/ entrepreneur
Paddy Holohan	Male	Mixed martial artist
Sean Harrington	Male	Award-winning architect
Richard Sadlier	Male	TV pundit/Psychotherapist/Former professional soccer player

Table 2. *Feasibility study timeline*

Group	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April
Full program (treatment)	Teacher training	Dispositions pretest & PROSPER	PROSPER	Dispositions & quiz post-test	-	Engagement post-test	-	-	-
Full program (control)		Dispositions pretest	-	Dispositions & quiz post-test	-	Engagement post-test	PROSPER	-	-
Reduced program (treatment)		-	-	-	Dispositions & quiz pretest	PROSPER	PROSPER Engagement post-test	Dispositions & quiz post-test	-
Reduced program (control)		-	-	-	Dispositions & quiz pretest	-	Engagement post-test	Dispositions & quiz post-test	PROSPER

Table 3. *Student facilitators and barriers*

Theme	Number of references	% of total references
Facilitators		
General interest in the program	51	40.2
Specific aspects of the program	28	22.0
Teacher effectiveness	5	3.9
Less pressure as a student	4	3.1
Facilitating identity development	1	0.8
Barriers		
Issues with content	26	20.5
Issues with teachers	6	4.7
Did not like content in general	4	3.1
Discontinuity with lessons	2	1.6
Reference totals		
Total facilitator references	89	70.1
Total barrier references	38	29.9
Total references	127	100.0

Table 4. *Teacher facilitators and barriers*

Theme	Number of references	% of total references
Facilitators		
PROSPER content	56	33.7
Expanding PROSPER	11	6.6
Relationships with students	9	5.4
Student engagement	9	5.4
Teaching effectiveness	6	3.6
Generally enjoyed the program	6	3.6
Barriers		
Program design issues	47	28.3
Inability to engage in the program	18	10.8
PROSPER as unsustainable	2	1.2
A lack of understanding	2	1.2
Reference totals		
Total facilitator references	97	58.4
Total barrier references	69	41.6
Total references	166	100.0

Table 5. *Student change*

Theme	Number of references	% of total references
Knowledge change		
Respect for others	15	30.0
Motivation	11	22.0
Choosing one's attitude	8	16.0
Attention	3	6.0
Identity	2	4.0
Momentary engagement change		
Self-regulation	7	14.0
Motivation	2	4.0
Respect for others	1	2.0
Disposition change		0.0
Facilitating competency change	1	2.0
Reference totals		
Total knowledge references	39	78.0
Total engagement references	10	20.0
Total self-system references	1	2.0
Total references	50	100.0

Table 6. *Descriptive statistics*

Study/Item	Treatment		Control	
	Mean	SD	Mean	SD
School A				
Knowledge post-test	6.34	1.85	5.72	1.91
Momentary physical action	14.24	5.26	13.57	5.23
Momentary mental action	3.08	0.74	3.07	0.74
Momentary emotion/motivation	2.63	1.00	2.84	0.94
Disposition mental/physical action pretest	4.20	1.07	4.03	1.09
Disposition mental/physical action post-test	4.11	1.16	4.15	.99
Disposition emotion/motivation pretest	4.65	1.07	4.33	1.15
Disposition emotion/motivation post-test	4.48	1.01	4.37	0.87
School B				
Knowledge pretest	5.68	1.79	4.81	2.04
Knowledge post-test	5.20	2.57	4.72	3.32
Momentary physical action	16.15	5.10	16.79	2.60
Momentary mental action	2.82	0.66	2.92	0.63
Momentary emotion/motivation	2.38	0.72	2.73	0.75
Disposition mental/physical action pretest	3.85	0.72	3.83	0.86
Disposition mental/physical action post-test	3.81	0.82	3.83	0.73
Disposition emotion/motivation pretest	4.47	1.15	4.27	1.01
Dispositional emotion/motivation post-test	4.51	1.25	4.38	1.05

**Table displays data with imputed values.*

Table 7. *School A descriptive statistics by ability track*

Study/Item	Treatment			Control		
	Low	Moderate	High	Low	Moderate	High
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
School A						
Knowledge post-test	6.98 (1.86)	5.52 (1.62)	6.62 (1.84)	5.42 (1.97)	5.85 (2.07)	5.94 (1.70)
Momentary physical action	14.26 (4.09)	10.49 (5.67)	17.59 (2.92)	12.61 (4.31)	14.53 (5.75)	13.80 (5.69)
Momentary mental action	3.10 (.80)	2.90 (.65)	3.23 (.76)	2.77 (.74)	3.48 (.67)	3.04 (.67)
Momentary emotion/motivation	2.76 (.93)	2.51 (1.05)	2.66 (1.03)	2.70 (.90)	3.01 (1.10)	2.83 (.82)
Disposition mental/physical action pretest	4.19 (1.44)	4.50 (.73)	3.93 (.99)	3.68 (1.05)	4.22 (1.23)	4.26 (.93)
Disposition mental/physical post-test	4.17 (1.30)	4.06 (1.11)	4.12 (1.14)	4.21 (1.04)	3.97 (1.17)	4.24 (.75)
Disposition emotion/motivation pretest	4.45 (1.38)	4.92 (.81)	4.54 (1.01	4.09 (1.17)	4.28 (1.21)	4.63 (1.04)
Disposition emotion/motivation post-test	4.32 (1.38)	4.78 (.68)	4.31 (1.01)	4.43 (.66)	4.28 (.96)	4.37 (1.00)

Table 8. *Correlation matrix School A*

		1	2	3	4	5	6	7	8
1	Knowledge post-test	1							
2	Momentary physical action	.38**	1						
3	Momentary mental action	.31**	.25**	1					
4	Momentary emotion/motivation	.19*	.26**	.44**	1				
5	Disposition mental/physical action pretest	.41**	.39**	.40**	.29**	1			
6	Disposition mental/physical action post-test	.31**	.25**	.28**	.18*	.66**	1		
7	Disposition emotion/motivation pretest	.31**	.31**	.22**	0.09	.62**	.51**	1	
8	Disposition emotion/motivation post-test	.32**	.34**	.26**	0.11	.49**	.51**	.63**	1

*** p = < .001, * p = .05. Table displays data without missing values replaced.*

Table 9. *Correlation matrix School B*

		1	2	3	4	5	6	7	8
1	Knowledge pretest	1							
2	Knowledge post-test	.21*	1						
3	Momentary physical action	-.02	.17	1					
4	Momentary mental action	0.02	.26**	.21*	1				
5	Momentary emotion/motivation	.06	.30**	.29**	.43**	1			
6	Disposition mental/physical action pretest	.40**	.17	.07	.05	.09	1		
7	Disposition mental/physical action post-test	.20*	.40**	.15	.08	.25**	.55**	1	
8	Disposition emotion/motivation pretest	.38**	.07	.28**	.04	.11	.45**	.30**	1
9	Disposition emotion/motivation post-test	.32**	.44**	.32**	.12	.19*	.31**	.51**	.65**

*** p = < .001, * p = .05. Table displays data without missing values replaced.*

Table 10. *Main effect of intervention between control and treatment groups*

Dimension	Model Type	F	p	η_p^2
School A				
Knowledge	ANOVA	4.679	.032	.03
Momentary engagement*	MANOVA	.930	.428	.02
*Momentary physical action		.368	.545	.00
*Momentary emotion/motivation		1.753	.187	.01
*Momentary mental action		.026	.872	.00
Dispositional emotion/motivation	ANCOVA	.273	.602	.00
Dispositional mental/physical action	ANCOVA	1.005	.318	.01
School B				
Knowledge	ANOVA	.145	.704	.15
Momentary engagement*	MANOVA	2.434	.068	.06
*Momentary physical action		.821	.367	.01
*Momentary emotion/motivation		7.135	.009	.05
*Momentary mental action		.813	.369	.01
Dispositional emotion/motivation	ANCOVA	.037	.848	.00
Dispositional mental/physical action	ANCOVA	.060	.808	.00

Table 11. *Effect of intervention for School A ability tracks*

Dimension	Model Type	F	p	η_p^2
Between ability tracks				
Knowledge	ANOVA	1.578	.210	.020
Momentary engagement*	MANOVA	2.866	.010	.05
*Momentary physical action		6.265	.002	.08
*Momentary emotion/motivation		0.009	.991	.00
*Momentary mental action		1.718	.183	.02
Dispositional emotion/motivation	ANCOVA	1.390	.252	.02
Dispositional mental/physical action	ANCOVA	4.361	.014	.05
Interaction of treatment/control				
Knowledge	ANOVA	3.281	.040	.041
Momentary engagement*	MANOVA	4.318	.000	.08
*Momentary physical action		9.263	.000	.10
*Momentary emotion/motivation		1.016	.364	.01
*Momentary mental action		5.910	.003	.07
Dispositional emotion/motivation	ANCOVA	1.318	.271	.02
Dispositional mental/physical action	ANCOVA	1.224	.297	.02

Table 12. *Significant post hoc analyses*

Study / Concept	*Model Type*	*Bonferroni Simple Effect*
School A		
Knowledge	Within subjects	low ability track treatment (*M* = 6.98, *SD* = 1.86) > low ability track control (*M* = 5.42, *SD* = 1.97)*
	Between subject	low ability track treatment (*M* = 6.98, *SD* = 1.86) > moderate ability track treatment (*M* = 5.52, *SD* = 1.62)*
Physical action	Within subjects	moderate ability track control (*M* = 14.53, *SD* = 5.75) > moderate ability track treatment (*M* = 10.49, *SD* = 5.67)*
		high ability track treatment (*M* = 17.59 , *SD* = 2.92) > high ability track control (*M* = 13.80 , *SD* = 5.69)*
	Between subjects	low ability track (*M* = 14.26, *SD* = 4.09) > moderate ability track (*M* = 10.49, *SD* = 5.67)*
		high ability track (*M* = 17.59, *SD* = 2.92) > moderate ability track (*M* = 10.49, *SD* = 5.67)**
		high ability track (*M* = 17.59, *SD* = 2.92) > low ability track (*M* = 14.26, *SD* = 4.09)*
Momentary mental action	Within subjects	moderate ability track control (*M* = 3.48 , *SD* = .67) > moderate ability track treatment (*M* = 2.90, *SD* = .65)*
	Between subjects	moderate ability track control (*M* = 3.48, *SD* = 0.67) > low ability track control (*M* = 2.77, *SD* = .74)*
Dispositional mental/physical action	Between subjects	low ability track control (*M* = 4.21, *SD* = 1.04) > moderate ability track control (*M* = 3.97, *SD* = 1.17)*
School B		
Momentary emotion/motivation	Between subjects	control group (*M* = 2.73, *SD* = .75) > treatment (*M* = 2.38, *SD* = .72)*

**$p < .01$
*$p < .05$