This is a repository copy of *Discipline identification, identity incompatibility, belonging and their association with deep approaches to learning and academic self-efficacy during COVID-19 in the UK*.

Article:

Discipline identification, identity incompatibility, belonging and their association with deep approaches to learning and academic self-efficacy during COVID-19 in the UK

Vladislav H. Grozev[1] · Matthew J. Easterbrook[2] · Donna C. Jessop[2]

Abstract

Previous research indicates that discipline identification — the level of integration of one's discipline of study into the self-concept — is associated with deep approaches to learning and academic self-efficacy. However, it is not known whether these relationships would hold in the context of learning during the COVID-19 pandemic. The present study investigates this, as well as exploring whether belonging, identity incompatibility, and virtual and in-person time spent with fellow students and with faculty act as potential antecedents of discipline identification. A cross-sectional online survey with $n = 385$ students in the UK was conducted during the spring term (February–May) of the 2019–2020 academic year, when UK universities were under COVID-19 restrictions. Of those students, $n = 109$ completed a follow-up survey during the autumn term (September–December) of the 2020–2021 academic year. Due to pandemic-related changes, the two waves of data were analysed separately using path analysis. During the spring term, identity incompatibility and discipline identification were significantly associated with both deep approaches to learning and academic self-efficacy. There were also significant indirect effects of belonging on both deep approaches to learning and academic self-efficacy via discipline identification. During the autumn term, discipline identification was again significantly associated with both academic outcomes. Identity incompatibility was significantly associated with academic self-efficacy. There were also indirect effects of identity incompatibility and belonging on deep approaches to learning via discipline identification. These results add to the literature on the importance of discipline identification and associated social-psychological processes in predicting important higher education outcomes during the COVID-19 pandemic.

Keywords Discipline identification · Academic self-efficacy · Deep approaches to learning · Belonging · Identity incompatibility · COVID-19

In response to the COVID-19 pandemic (WHO, 2020), most UK universities stopped all face-to-face academic work on the 23rd of March 2020 and moved teaching and learning online (Dietrich et al., 2020). Despite the best efforts of higher education institutions,

---

Extended author information available on the last page of the article

scholars have argued that this shift to online education has impaired students' academic outcomes. For example, Pasion et al. (2020) found that students who experienced the first wave of the pandemic (Spring term, 2020) exhibited less dedication to their discipline in comparison to the students in the previous cohort. Similarly, Aucejo et al. (2020) reported that approximately half of their students in a large university in the USA had reduced their study hours as a consequence of the switch to online learning which, in turn, lowered their academic achievement. Finally, participants in a study conducted by Dodd et al. (2021) reported finding learning online harder than learning in-person. Altogether, these studies suggest that the move to online learning has had adverse consequences for higher education students' motivation and commitment to learning.

Therefore, it is important to research factors which invigorate and maintain students' desire to learn. One such factor is the students' identification with their discipline of study, commonly referred to as discipline identification, as its adoption has been previously found to positively predict both students' academic achievement (Bliuc et al., 2011b) and their approaches to learning (Smyth et al., 2015). Stemming from the Social Identity approach (Tajfel et al., 1979; Turner et al., 1987), discipline identification is considered a part of one's self-concept which is derived from their active, meaningful, and emotionally significant participation as a student of their academic discipline (Bliuc et al., 2011a). More specifically, discipline identification refers to the level to which a student perceives that their discipline of study is a part of their self-concept; that is, as part of their cognitive representation of themselves. Thus, when a student's identity as a student of their discipline is cognitively activated in a given situation (for example, one thinks of oneself as a Psychology student), the individual embodies the values and norms of their ingroup (e.g., values learning, engages in studying, etc.) (Turner, 1991).

Therefore, assuming that the values and normative behaviours of the students in one's discipline are related to being studious and engaging with the learning process, a student who identifies strongly with their discipline would behave in line with these norms (Smyth et al., 2015). Indeed, research in the past decade has shown exactly that students who identify more strongly with their discipline evidence higher levels of academic achievement (Bliuc et al., 2011b) and experience more study satisfaction (Pennington et al., 2018), with beneficial effects for their general wellbeing (Greenaway et al., 2017). These results suggest that fostering discipline identification in students is an important mission in higher education and that it may inoculate students against the detrimental effects that the switch to online learning may have had on their education.

Nonetheless, to the best of our knowledge, no previous research has investigated whether discipline identification is associated with such positive educational outcomes during the COVID-19 pandemic. Indeed, because of COVID-19, most traditional identification-building exercises such as meeting faculty in-person, attending clubs related to one's discipline of study, and social gatherings with fellow students, were prohibited or took place online. The absence of such specific, direct contact meetings with fellow students or faculty made the virtual learning context an important arena in which to test whether discipline identification was still associated with increases in important academic outcomes for students in higher education. The role of discipline identification in facilitating positive educational outcomes even in fully virtual learning settings remains highly relevant to higher education, given that many features of the COVID-19 learning context—such as online lectures, tutorials, and 24-h virtual exams—have remained in place following the emergency remote education period (Tilak & Kumar, 2022). If discipline identification is indeed related to a range of educational outcomes for students in higher education, we hope that the present research will inspire future research

examining how discipline identification can be fostered within virtual learning settings specifically.

Therefore, in order to ascertain whether discipline identification would continue to predict academic outcomes in the unique virtual learning situation necessitated by the COVID-19 pandemic, the present study investigated whether discipline identification would predict the academic outcomes of deep approaches to learning (Biggs et al., 2001) and academic self-efficacy (Marsh et al., 2008). By building on the 3P Model of Student Approaches to Learning (Biggs, 1999; Kember et al., 2020) and the Theory of Self- vs. Externally-Regulated Learning (de la Fuente et al., 2015, 2017; 2020; 2021), we are seeking to centre discipline identification as an important regulatory factor for students in higher education as we are investigating whether it is a positive predictor of deep approaches to learning and academic self-efficacy during the COVID-19 pandemic virtual learning context. Indeed, if discipline identification proved to be a stable positive predictor of these important academic outcomes, then it is imperative to consider factors that could either foster or disrupt students' discipline identification. To do this, we explored whether belonging at university, identity incompatibility, and virtual and in-person time spent with faculty and students acted as antecedents to discipline identification.

The following section thus describes the importance of deep approaches to learning and academic self-efficacy to the education process, as situated within the 3P Model of Student Approaches to Learning and the Theory of Self- vs. Externally-Regulated Learning. The subsequent section describes how belonging at university, identity incompatibility, and virtual and in-person time spent with faculty and students could be linked to discipline identification within the virtual learning context. Finally, we present the results of a two-wave investigation of the above processes within the UK higher education learning context during the COVID-19 pandemic.

Academic correlates of discipline identification

The 3P model of student approaches to learning and the theory of self- vs. externally regulated learning

Prior to discussing deep approaches to learning and academic self-efficacy as important consequences of discipline identification, it is important to situate these factors within established frameworks of teaching and learning in higher education. To achieve this goal, the 3P Model of Student Approaches to Learning (Biggs et al., 2001; Kember et al., 2020) and the Theory of Self- vs. Externally-Regulated Learning (de la Fuente et al., 2015) offer two student-centred and complimentary perspectives which help to situate discipline identification as a central variable in the higher learning process.

The first of those, the 3P Model of Student Approaches to Learning, was developed to describe how the personal characteristics of the student as well as the teaching context serve to inform the student's subsequent learning processes. Known as the *presage* stage of the learning experience, this is often the stage in which academics and practitioners serve to exact change within the student's learning environment in order to then effect positive consequences for the way students learn, and subsequently achieve important academic, health and social outcomes (Kember et al., 2020). The second stage, or the *process* stage, refers strictly to the socio-psychological and educational processes that students go through in order to then achieve the desired outcomes of their education or social adaptation at

university. Stemming from the name of the model, the typical factors included at this stage have been students' approaches to learning (Biggs, 1999; Bliuc et al., 2011a; Ruohoniemi & Lindblom-Ylänne, 2009), although meta-analytic evidence suggests that other key — and most importantly, malleable — socio-psychological and educational processes (such as academic self-efficacy or students' academic self-concept; Richardson et al., 2012) could also be located at this stage of the learning process as they positively predict subsequent academic outcomes. The final stage, or the *product* stage, concerns the important social and educational outcomes of the learning process. Although the vast majority of literature has simply included grade point average or academic achievement more generally at this stage (Bliuc et al., 2011b; Smyth et al., 2015, 2017), other literature has sought to diversify the outcomes discussed at this final stage by discussing graduate outcomes (Kember et al., 2017, 2020) or procrastination and academic stress (de la Fuente et al., 2020, 2021; Smyth et al., 2019a, b). Altogether, the 3P Model of Student Learning provides a valid framework for the present research as we can firmly situate the factors that predict discipline identification (belonging at university, identity incompatibility, and virtual and in-person time spent with faculty and students) at the *presage* stage, discipline identification as a malleable socio-psychological process at the *process* stage, and deep approaches to learning and academic self-efficacy as the *products* of discipline identification. The following sections outline those two outcomes in more detail.

The Theory of Self- vs. Externally-Regulated Learning (de la Fuente et al., 2015) also offers an important framework to explain the role of discipline identification as central to the students' learning process. Building on the 3P Model, the Theory posits that factors that promote self-regulatory learning in students are related to positive emotionality and positive learning outcomes. Indeed, within this framework, discipline identification can be considered a self-regulatory learning factor as it promotes adherence to important normative behaviours that support learning (such as spending more time in studying, revising with coursemates, class attendance, etc.). By doing so, discipline identification would have an important role in keeping students focusing on the learning processes, and subsequently being related to positive educational outcomes such as deep approaches to learning and academic self-efficacy. These two educational outcomes are discussed next.

Deep approaches to learning

One important academic outcome in higher education is the adoption of deep approaches to learning (Biggs, 1988). Students who use the deep approach signal an intrinsic desire to consume information for the sake of improving their own understanding of the material rather than to merely pass an examination (Ramsden, 1979). Deep approaches to learning are associated with higher levels of academic achievement (Richardson et al., 2012) and greater study progress (Duff, 2004; Lindblom-Ylänne & Lonka, 1998). Deeper approaches to learning are also related to students having altruistic life goals (Wilding & Andrews, 2006). Thus, adopting deep approaches to learning within higher education is important for students' academic and societal development.

Scholars have previously linked discipline identification to deep approaches to learning. Theoretically, Smyth et al. (2015) argued that, if the values and norms of the students in the particular discipline are associated with studiousness and a passion for learning, then discipline identification is likely to foster deep approaches to learning. In fact, the work of Bliuc and colleagues (Bliuc et al., 2011a, 2011b) and Smyth and colleagues (Smyth et al., 2015; 2017; Smyth et al., 2019a, b; Smyth et al., 2019a, b) has consistently shown exactly

that a stronger sense of discipline identification predicts deeper approaches to learning, which, in turn, predict increased academic performance. Additionally, but from a different perspective, Boyle et al. (2007) have shown that fieldtrips within the Geography discipline — a collective learning experience which presumably increases discipline identification — led to an increase in Geography students' usage of deep approaches to learning. Nonetheless, no previous research has examined whether discipline identification predicts deep approaches to learning in a predominantly virtual-learning context, such as the one necessitated by the COVID-19 pandemic. Therefore, we sought to explore whether students' levels of discipline identification would still be associated with deep approaches to learning during the COVID-19 pandemic.

Academic self-efficacy

Another important academic outcome in higher education is academic self-efficacy (Multon et al., 1991). Academic self-efficacy refers to the belief in one's potential to perform academic tasks or behaviours at a certain level (Schunk & Pajares, 2002) and is a positive predictor of remaining at university (Gore et al., 2005) and academic achievement (Richardson et al., 2012). As such, academic self-efficacy is an important intermediary academic outcome and boosting academic self-efficacy levels has been a goal for scholars and educators alike (Chemers et al., 2001).

However, research that examines the link between discipline identification and academic self-efficacy is in its infancy. Theoretically, Gore (2006) asserts that a high sense of academic self-efficacy is linked to behaviours that support academic outcomes, such as speaking to faculty, discussing material with fellow students, and asking for help from student affairs representatives; behaviours which are also associated with strongly identifying with one's discipline and intrinsic interest.

Empirically, Simonsen and Rundmo (2020) showed that there was a positive correlation between school identification and academic self-efficacy in their study of Norwegian high school students. In the context of higher education, Pennington et al., (2018, pers. comm.) revealed that social identification with one's university was positively correlated with academic self-efficacy across students' first year at university. Cameron (1999) also found that identification as a student predicted group-based efficacy beliefs and subsequently well-being. There has, however, been a paucity of research that has directly explored the link between discipline identification and academic self-efficacy. The present study aims to bridge this gap in the literature and investigate whether discipline identification was associated with academic self-efficacy during the COVID-19 pandemic.

Antecedents of discipline identification

If discipline identification is indeed linked to increases in positive educational outcomes such as deep approaches to learning and academic self-efficacy, then it is important to consider factors that increase students' levels of discipline identification. Prior to the COVID-19 pandemic, discipline identification had been found to be predicted by a host of antecedent constructs, including the need for belonging with other students on the course (Greenaway et al., 2017; Seyranian et al., 2018) and identity incompatibility (de Vreeze et al., 2018; Iyer et al., 2009). However, because of the COVID-19 pandemic (WHO, 2020), most UK universities switched to delivering teaching online. This meant that the

time that students spent with their fellow students and with members of faculty in-person and online were the main opportunities they had to build their discipline identification. We explore these six putative antecedents of discipline identification — belonging, identity incompatibility, virtual and in-person time spent with fellow students and virtual and in-person time spent with faculty members — and discuss each, below. Indeed, as these factors would form part of the *presage* stage in the 3P Model of Student Approaches to Learning, altering their levels either personally or structurally could allow students to foster a deeper sense of discipline identification, which could then lead to increasing students' levels of academic self-efficacy and adopting deeper approaches to learning.

Belonging with fellow students

Multiple researchers from various theoretical standpoints have hypothesised that the need for belonging can motivate one's desire to join a self-referent group (Baumeister & Leary, 1995; Brewer, 1991; Greenaway et al., 2017; Vignoles et al., 2006). Indeed, Baumeister and Leary (1995) refer to belonging as a fundamental human need to maintain or achieve closeness to other people. Thus, the need to belong is recognised as one of the primary reasons for joining and identifying with groups (Easterbrook & Vignoles, 2012, 2013; Vignoles, 2011).

Empirically, Bizumic et al. (2009) found that group support (which included belonging with classmates) predicted identification with school over time for high-school students. In the realm of higher education, Greenaway et al. (2017) have shown that meeting the need for belonging with other university students predicted identification over a 6-week period. Similarly, Easterbrook and Vignoles (2012) have shown that satisfying the need for belonging leads to increased identification with novel groups over time. Finally, Seyranian et al. (2018) found that feeling a sense of belonging in relation to other students on a Physics course was positively correlated with identifying as a physicist. Altogether, the accumulated evidence suggests that belonging can lead to increases in identification with an important group. Thus, we posited that students who felt that they belonged more strongly with other students on their course would have increased levels of discipline identification during the COVID-19 pandemic.

Satisfying the need for belonging might also have direct positive effects on the academic outcomes in the present study. Belonging has been previously related to increased academic self-efficacy for minoritized groups such as Hispanics (Holloway-Friesen, 2019), females (Aelenei et al., 2020) and African Americans (Walton & Cohen, 2007). Betoret and Artiga (2011) have also found that satisfaction of the need for belonging is associated with higher usage of deep approaches to learning and higher academic achievement in university students. As such, we first explored whether the effects of belonging on deep approaches to learning and academic self-efficacy were mediated by discipline identification. However, we also explored whether belonging is directly and significantly associated with academic self-efficacy and deep approaches to learning, unmediated by discipline identification.

Identity incompatibility

Although students may feel that they belong with other students on their course, the learner's educational identities may not necessarily be compatible with their existing social categorisations (Haslam, 2017). This is referred to as identity incompatibility (Iyer et al.,

2009), which is the sense of adjacent identities in the self-concept clashing due to differences in values or normative expectations for behaviour. Theoretically, if the new discipline identity is incompatible with the existing network of identities because of clashing norms and/or values, then it will be more challenging for the student to assimilate the new identity into their existing self-concept (Amiot et al., 2007). This may result in lower identification with the new identity (Iyer et al., 2009).

To illustrate this, previous research has indicated that some university students come from communities where young people do not traditionally go to university, and/or going to university is discouraged (Aries & Seider, 2005; Bufton, 2003; Reay et al., 2010). Such participants in these studies experienced conflict between their social backgrounds and their new identity as a university student, driven by the clash in normative behaviours expected by their family and friends and those that are normative for university students. As such, research from the UK, Belgium, and the Netherlands has shown that university students from disadvantaged backgrounds feel that their identity as a student is incompatible with who they were prior to attending university (de Vreeze et al., 2018; Iyer et al., 2009; Jetten et al., 2008; Veldman et al., 2019). This sense of incompatibility between identities has been consistently found to reduce discipline identification and indirectly (via discipline identification) predict lower positive affect and higher levels of depression (Iyer et al., 2009). It also predicts less social integration at university and lower academic achievement (Easterbrook et al., 2022; Veldman et al., 2019) and lower anticipated fit at more selective universities for future students (Nieuwenhuis et al., 2019). Cumulatively, experiencing identity incompatibility can decrease important academic outcomes, and, most pertinent to the current research, discipline identification.

During the pandemic, most students in the latter stages of their education had returned home (Aristovnik et al., 2020), which may have exacerbated their experience of identity incompatibility. Because the competing norms of higher education and general background would have been in stark contrast at that time, we expected identity incompatibility to be a negative predictor of discipline identification in the present research. Additionally, we also explored whether identity incompatibility is associated with lower academic self-efficacy and less usage of deep approaches to learning, effects we expected to be mediated by discipline identification. However, as identity incompatibility is considered a dysregulatory factor to learning within the Theory of Self- versus Externally-Regulated Learning due to promoting dissociation with norms of studying, we also tested whether identity incompatibility is directly associated with lower levels of academic self-efficacy and less adoption of deep approaches to learning.

Time spent with fellow students and faculty

In a similar way to fostering discipline identification via belonging with fellow students, learners can boost their discipline identification by engaging in their academic commitments—such as attending lectures, workshops and seminars—where they enact the identity and learn more about their discipline of study (Smyth et al., 2017). Additionally, students can further derive discipline identification from participating in extracurricular activities such as meeting faculty informally at social gatherings or attending clubs related to their discipline of study. These extracurricular activities provide a strengthening of one's ties to their discipline and university (Chickering & Reisser, 1993; Kuh, 1995). As such, in normal circumstances, we would be able to predict students' discipline identification from

their participation in academically relevant extracurricular activities and their academic commitments.

However, due to the COVID-19 pandemic and the move to online teaching (Dietrich et al., 2020), most academic and extracurricular activities were halted or took place online. For most students, their only contact with their fellow students and faculty members was during online seminars, lectures, and/or workshops, which limited the available ways that they could build discipline identification. Accordingly, we were interested in whether and how virtual and in-person time spent with faculty and with other students were related to discipline identification. As some students received more online instruction than other students—depending on their institution and course of study—we measured the time students spent in contact with faculty, both virtually and in-person, and included these as predictors of discipline identification in our models. We predicted that students who received more instruction and/or met with faculty more often — either in virtual or in-person settings — would have higher levels of discipline identification.

We also predicted that some students might additionally be co-learning or meeting their fellow students either in-person or virtually, and that this, too, would be related to discipline identification. Therefore, we also measured the time students spent with fellow students (separately for virtually and in-person time). We posited that students who spent more time with fellow students would have increased levels of discipline identification. We posited that these four factors — time spent in in-person and virtual settings with faculty and with students — would also predict usage of deep approaches to learning and academic self-efficacy as mediated via discipline identification. We also tested whether these time-based measures would also be directly and significantly associated with academic self-efficacy and deep approaches to learning. Importantly, these time-based measures also served as a proxy for examining the teaching context. As such, we heeded the call of Kember et al. (2020), who noted the predominance of examining personal factors in the *presage* stage of the 3P Model in the literature to date and advocated for including factors that relate to students' perceptions of the specific teaching context.

The present study

By building on the theoretical assertions of the 3P Model of Student Approaches to Learning and the Theory of Self- vs. Externally-Regulated Learning as well as empirical evidence from previous studies, we empirically tested the following two hypotheses in the present study:

H1. Discipline identification would be a significant and positive predictor of academic self-efficacy for UK higher education students during the COVID-19 pandemic.
H2. Discipline identification would be a significant and positive predictor of deep approaches to learning for UK higher education students during the COVID-19 pandemic.

We also took the opportunity to explore whether belonging with other students on one's course, identity incompatibility, and time spent with faculty and fellow students (both in-person and virtual) would predict discipline identification and, in turn, deep approaches to learning and academic self-efficacy.

In order to test these hypotheses and exploratory hypotheses, we collected data from the same participants on two occasions — during the Spring term of the 2019–2020 academic year and the Autumn term of the 2020–2021 academic year. Originally, we intended to investigate the associations between students' levels of discipline identification during and after the COVID-19 pandemic and the academic outcomes. However, the COVID-19 pandemic continued during the Autumn term, which rendered our original plan impossible.

Therefore, although we have data from some of the same participants at both time points, we opted against making any longitudinal predictions about our data because the dramatic differences in the pandemic situation between the two academic terms led us to expect few prospective relationships between the variables. In the spring term, all students were attending lectures and seminars only virtually, whereas in the autumn term some in-person lectures and small-group teaching took place. Additionally, in comparison to the spring term, the autumn term saw a greater number of students living in university residences rather than at home and the relaxing of some pandemic-related restrictions, including the restriction of meeting only up to 6 people at once in-person. The rapid pace of change and the differences between the two time points meant that we did not anticipate any associations amongst constructs longitudinally. Still, we confirmed this by conducting bivariate latent change score analyses (Kievit et al., 2018), which revealed no significant cross-wave effects between the constructs of interest. We thus treat the data as two separate datasets.

Method

Participants

Initially, 604 UK university students were recruited between April and June 2020. Of those, 184 students did not provide any information about their discipline identification and, hence, their responses were not eligible for inclusion in the analysis of the first wave data. The remaining 420 participants were between 18 and 53 years of age ($M = 21.42$, $SD = 4.07$). The sample was predominantly female (81.20%, $n = 341$), 16% ($n = 67$) of respondents identified as male, 2.10% ($n = 9$) as non-binary and three participants elected not to disclose their gender. The majority of the sample (79.50%) indicated that they were from the UK and identified their ethnicity as White-British (65.70%) or from other White backgrounds (16.20%).

In the second term, we collected data from 143 of the initial participants. Fifteen of those were no longer students at university, which is why we omitted their responses from analysis. Further ten students did not provide any data on discipline identification, and, as such, their responses were omitted from analysis. The remaining 118 participants were between 18 and 28 years of age ($M = 21.42$, $SD = 4.07$). The remaining sample was still predominantly female (80.50%, $n = 95$), 16.10% ($n = 19$) identified as male and four participants identified as non-binary. The majority of the remaining participants (83.90%) indicated that they were from the UK and identified their ethnicity as White-British (66.10%) or from other White backgrounds (21.20%) (Table 1).

Table 1 Descriptive statistics and zero-order correlations for all variables in both waves

	N	M	SD	Correlations																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. TimeDirectFaculty1	441	.33	1.46	1																	
2. TimeVirtualFaculty1	423	2.64	4.80	.18***	1																
3. TimeDirectStudents1	437	3.32	26.07	.00	−.03	1															
4. TimeVirtualStudents1	420	3.75	12.06	−.03	.17**	.06	1														
5. Discipline ID1	487	4.22	.95	.00	.14**	.03	.25***	1													
6. Self-efficacy1	437	1.90	.72	.08+	.09+	.02	.10*	.31***	1												
7. DeepApproach1	423	2.39	.85	.13**	.12*	.07	.12*	.45***	.53***	1											
8. Belonging1	473	4.24	1.19	.01	.09+	.05	.25***	.65***	.21***	.29***	1										
9. Identity Incompatibility1	466	4.09	1.71	−.01	−.05	.10*	−.06	−.32***	−.37***	−.39***	−.18***	1									
10. TimeDirectFaculty2	116	1.16	3.20	−.01	.21*	−.06	.33***	.04	.15	.07	−.05	−.05	1								
11. TimeVirtualFaculty2	116	12.21	8.38	−.16+	.02	.24**	−.15	.09	−.14	.06	.07	−.04	−.06	1							
12. TimeDirectStudents2	115	7.84	29.61	−.02	−.03	.03	.17+	.15	−.14	−.13	.19*	.04	−.03	.20*	1						

Table 1 (continued)

	N	M	SD	Correlations																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
13. TimeVirtualStudents2	116	3.79	5.03	.05	.15	.02	−.04	.12	.18[+]	.21[*]	.16[+]	−.13	−.02	.33[***]	.15	1					
14. DisciplineID2	118	4.30	.86	−.15[+]	.23[*]	.18[+]	−.05	.52[***]	.12	.22[*]	.41[***]	−.19[*]	.10	.29[**]	.13	.27[**]	1				
15. Self-efficacy2	115	2.12	.65	.12	.01	.11	−.08	.14	.37[***]	.33[***]	.02	−.30[**]	.22[**]	.02	−.01	.06	.41[***]	1			
16. DeepApproach2	115	2.68	.88	.11	−.02	.05	−.11	.11	.26[**]	.51[***]	.00	−.21[*]	.00	.03	−.03	.24*	.34[***]	.49[***]	1		
17. Belonging2	118	4.50	1.07	−.13	.15	.18[+]	.10	.50[***]	.13	0.13	.57[***]	−.12	−.03	.17[+]	.26[**]	.27[**]	.65[***]	.17[+]	.20[*]	1	
18. IdentityIncompatibility2	117	3.31	1.41	−.09	.07	−.15	.17[+]	−.20[*]	−.30[**]	−.21[*]	−.13	.44[***]	−.08	−.12	−.11	−.16[+]	−.40[***]	−.48[***]	−.23[*]	−.30[**]	1

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Materials

Every participant completed an online questionnaire using Qualtrics, which assessed the constructs described below. Unless otherwise stated, participants answered all questions on a 7-point Likert scale from *strongly disagree* (1) to *strongly agree* (7). Also, in order to make the questions more sensitive to the ongoing pandemic, all questions' wordings related to participants' experiences in the past 2 weeks (similar to Smyth et al., 2019a, b). All constructs were included in both surveys apart from the final block of demographic questions which was only asked in Wave 1 (Table 2).

Study information

Participants were asked to indicate their course and year of study as well as which UK university they attended.

Discipline identification

Participants' discipline identification was measured through Cameron's (2004) tri-partite scale, which has been independently validated by Obst and White (2005). This scale comprises 12 items, e.g., "In the past two weeks, being a 'xxx' student has had little to do with how I feel about myself". The blank space indicated the participant's discipline of study. Following Smyth et al., (2019a, b), we elected to use all of the items as a single factor measure of discipline identification. The resultant scale had acceptable internal consistency at both time points ($\alpha_1 = 0.80$, $\alpha_2 = 0.77$). A mean score was computed for each participant at each time point.

Belonging and identity incompatibility

Three questions assessed participants' belonging with other students on their course (e.g., "In the past two weeks, I have really felt like I belong as a [course of study] student"). The scale had a good internal reliability at both time points ($\alpha_1 = 0.79$, $\alpha_2 = 0.75$) and the responses were averaged to form an index of temporal belonging at both time points.

Similarly, two questions ("In the past two weeks, I have felt that being a university student fits with my present life" [reverse-scored] and "In the past two weeks, I have been afraid that my present life is incompatible with my identity as a university student") also assessed participants' identity incompatibility as adapted from Iyer et al. (2009). The two questions were strongly correlated at both time points ($r_1 = 0.65$, $r_2 = 0.64$) and thus formed an index of identity incompatibility for each participant at both time points.

Time spent with students and faculty members

Participants were asked to indicate with a number how many hours they spent in the last two weeks in in-person contact with their members of faculty, in virtual contact with their members of faculty (both were operationalised as one-to-one meetings with lecturers, lectures, seminars and workshops), in in-person contact with the students on their

course, and in virtual contact with the students on their course. Due to the pandemic, 88% and 87% of all participants at Wave 1 indicated that they did not spend any in-person time with members of faculty or their fellow students, respectively. Similarly, at Wave 2, 72% and 54% of participants did not spend any in-person time with members of faculty and fellow students, respectively. Because the numbers of students who did not spend any in-person time with faculty or other students at Wave 1 were very high, we opted against including the measures of in-person time spent with members of faculty and fellow students in the analysis of Wave 1 data. However, we included the measures of in-person time spent with other students and faculty in the analysis of the Wave 2 data (Table 3).

Academic self-efficacy

Participants were asked four questions adapted from Marsh et al. (2008) to measure their academic self-efficacy (e.g., "In the past two weeks, I have been certain I can understand the most difficult material presented in texts"). All questions were answered on a four-point scale ranging from *Almost never* (1) to *Almost always* (4). The scale had acceptable internal reliability at both time points ($\alpha_1 = 0.88$, $\alpha_2 = 0.86$) and the responses were averaged to form an index of academic self-efficacy at each time point.

Deep approaches to learning

Participants were asked twelve questions about their temporal deep and surface approaches to learning as adapted from the revised two-factor study process (R-SPQ-2F) scale (Biggs et al., 2001); e.g., "In the past two weeks, I have found that at times studying gives me a feeling of deep personal satisfaction". All questions were answered on a 5-point scale from *Never or only rarely true of me* (1) to *Always or almost always true of me* (5). The scale for deep approaches to learning had acceptable internal reliability at both time points ($\alpha_1 = 0.82$, $\alpha_2 = 0.84$) and the responses were averaged to form an index of deep approaches to learning at each time point.

Procedure

All participants were recruited via an online link, which was sent to their respective school of study coordinators or student representatives, all of whom were located at the researchers' home institution. They were asked to forward the survey to their students who were asked to provide their thoughts about their learning in light of the COVID-19 pandemic. Ethical approval for this study was granted by the researchers' home institution with code ER/VG68/10. Data collection took place between 24th April and 15th June 2020. Between October and December 2020, we again contacted all participants who initially provided their emails. We were only able to collect data from 143 of the original participants (66% attrition rate). Fifteen of those participants were no longer students at university and were thus excluded from the Wave 2 analysis. All data was handled in accordance with General Data Protection Regulation (GDPR, 2016) principles. At the beginning of the questionnaire, all participants indicated that they gave their consent to participate and their rights to confidentiality were presented. Participants could also withdraw their data by 23rd of December, 2020 but none did so.

Then, the main blocks of the questionnaire were presented in the order outlined in the Materials section. At the end of the first questionnaire, participants were invited to include their email in a separate survey. This email-only survey, the first and the second question-naires were linked by an automatically generated five-digit code which was not known to the participants. At this point, participants were signposted to two NHS resources if they had any concerns which arose from the questionnaire. After participants completed the second questionnaire, they were thoroughly debriefed about the purpose of the study and invited to include their email for one of the four £50 prizes**.**

Data analysis

Firstly, the two waves of data were combined into a single dataset. Doing this allowed us to test and ultimately opt against making any longitudinal predictions about the two waves of data through bivariate change score models (Kievit et al., 2018) as well as allowing us to collect the descriptive statistics and zero-order correlations between the constructs of inter-est in both waves.

Next, we removed two cases from further analysis as they had suspiciously high values of virtual time spent with other students (over 100 h in the past 2 weeks), which skewed the average result on that variable. This left us with 418 participants in the first analysis. All 118 cases which had data on the discipline identification measure were used in the second analysis. Due to the cross-sectional nature of the data in both waves, we then constructed alternative and competing models which allowed us to have more confidence in the pro-posed theoretical order of the analysed constructs. All alternative models along with their description can be found in the Supplementary Online Material to this article.

Finally, all descriptive statistics and zero-order correlations between the constructs of interest in both waves are presented in Table 1. All structural equation models were fit-ted using R 4.0.2 and the *lavaan* package (v0.6–7, Rosseel, 2012). All analyses were per-formed using maximum likelihood estimation. Finally, in order to robustly estimate the standardised errors of the parameters in the model, we performed a bootstrapping with 10,000 iterations for every model specified.

Results

Path models

We included the direct paths from belonging, incompatibility and the two virtual time spent variables (with faculty and with students) to deep approaches to learning, academic self-efficacy and discipline identification. We also included the paths from discipline iden-tification to deep approaches to learning and to academic self-efficacy. This allowed us to also test whether the effects of any of the exogenous variables on the two academic out-comes are mediated by discipline identification. We also included age and gender as exog-enous covariates in our model. We then allowed the exogenous predictors to covary with each other, and the two outcomes to covary with each other. The final theoretical model is presented in Fig. 1.
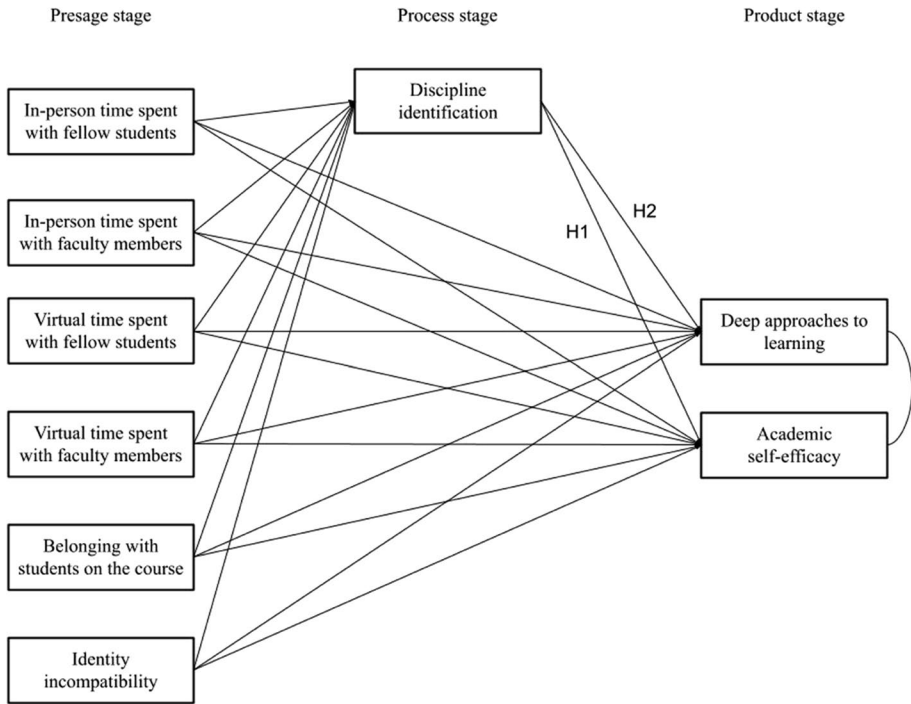
Fig. 1 Theoretical model. *Note.* The covariances between the exogenous variables were specified in the model but omitted here for brevity of presentation

Wave 1

The model[1] for the first wave of data is presented in Table 2 ($N = 385$). We found that discipline identification was a positive predictor of both deep approaches to learning ($b = 0.36$, $p < 0.001$) and academic self-efficacy ($b = 0.20$, $p < 0.001$). Similarly, belonging with fellow students ($b = 0.59$, $p < 0.001$), identity incompatibility ($b = -0.20$, $p < 0.001$) both significantly predicted discipline identification. Interestingly, we found that identity incompatibility had a significant direct effect on both deep approaches to learning ($b = -0.27$, $p < 0.001$) and academic self-efficacy ($b = -0.31$, $p < 0.001$).

There was a significant indirect effect of belonging on both deep approaches to learning (indirect effect $= 0.21$, $p < 0.001$) and academic self-efficacy (indirect effect $= 0.12$, $p = 0.001$) via discipline identification. In addition to its direct effects, there was a significant indirect effect of incompatibility on both deep approaches to learning (indirect effect $= -0.07$, $p < 0.001$) and academic self-efficacy (indirect effect $= -0.04$, $p = 0.006$) via discipline identification. Finally, age was a significant predictor of both deep approaches to learning ($b = 0.16$, $p = 0.002$) and academic self-efficacy ($b = 0.22$, $p < 0.001$), whereas being female was a negative predictor of academic self-efficacy only ($b = -0.15$, $p = 0.005$).

---

[1] As the model was fully saturated, model fit could not be estimated.

Table 2 Path estimates for academic self-efficacy, deep approaches to learning, and discipline identification in Wave 1 ($N=385$)

Path	b	p-value
Academic self-efficacy is predicted by:		
Direct effects		
Discipline identification (H1)	.20	<.001
Identity incompatibility	−.31	<.001
Belonging with fellow students	.03	.67
Virtual time with faculty	.01	.86
Virtual time with students	−.00	.96
Age	.22	<.001
Gender[a]	−.15	.005
Indirect effects		
Identity incompatibility via discipline identification	−.04	.006
Belonging via discipline identification	.12	.001
Virtual time with faculty via discipline identification	.01	.21
Virtual time with students via discipline identification	.02	.41
Deep approaches to learning are predicted by:		
Direct effects		
Discipline identification (H2)	.36	<.001
Identity incompatibility	−.27	<.001
Belonging with fellow students	.00	.94
Virtual time with faculty	.01	.90
Virtual time with students	−.01	.93
Age	.16	.002
Gender[a]	−.08	.12
Indirect effects		
Identity incompatibility via discipline identification	−.07	<.001
Belonging via discipline identification	.21	<.001
Virtual time with faculty via discipline identification	.02	.17
Virtual time with students via discipline identification	.03	.36
Discipline identification is predicted by:		
Direct effects		
Identity incompatibility	−.20	<.001
Belonging with fellow students	.59	<.001
Virtual time with faculty	.05	.15
Virtual time with students	.08	.33
Age	.00	.98
Gender	.06	.07

[a]Gender is coded as 2 for males and 3 for females. All participants who answered otherwise to this question were removed from analysis to preserve statistical power

Wave 2

Because the number of students who did not have any in-person contact with other students and faculty were lower, we opted to include the in-person time students spent with other

Table 3 Path estimates for academic self-efficacy, deep approaches to learning, and discipline identification in Wave 2 ($N = 103$)

Path	b	p-value
Academic self-efficacy is predicted by:		
Direct effects		
Discipline identification (H1)	.36	.01
Identity incompatibility	−.39	<.001
Belonging with fellow students	−.13	.40
Virtual time with faculty	−.04	.64
Virtual time with students	−.04	.65
In-person time with faculty	.14	.03
In-person time with students	−.05	.71
Age	.13	.15
Gender[a]	−.10	.33
Indirect effects		
Identity incompatibility via discipline identification	−.08	.05
Belonging via discipline identification	.21	.02
Virtual time with faculty via discipline identification	.07	.12
Virtual time with students via discipline identification	.00	.88
In-person time with faculty via discipline identification	.04	.17
In-person time with students via discipline identification	−.03	.66
Deep approaches to learning are predicted by:		
Direct effects		
Discipline identification (H2)	.37	.01
Identity incompatibility	−.09	.40
Belonging with fellow students	−.07	.62
Virtual time with faculty	−.09	.40
Virtual time with students	.20	.02
In-person time with faculty	−.06	.60
In-person time with students	−.07	.61
Age	.18	.10
Gender[a]	−.12	.28
Indirect effects		
Identity incompatibility via discipline identification	−.08	.05
Belonging via discipline identification	.22	.01
Virtual time with faculty via discipline identification	.07	.14
Virtual time with students via discipline identification	.00	.388
In-person time with faculty via discipline identification	.04	.21
In-person time with students via discipline identification	−.03	.68
Discipline identification is predicted by:		
Direct effects		
Identity incompatibility	−.21	.002
Belonging with fellow students	.59	<.001
Virtual time with faculty	.20	.02
Virtual time with students	.01	.87
In-person time with faculty	.10	.11
In-person time with students	−.07	.59
Age	.08	.23
Gender	.11	.18

[a]Gender is coded as 2 for males and 3 for females. All participants who answered otherwise to this question were removed from analysis to preserve statistical power

students and with faculty in the Wave 2 model. The model[2] for the second wave of data is presented in Table 3 ($N = 109$).

Similar to the first wave, we found that discipline identification was a positive predictor of both deep approaches to learning ($b = 0.37$, $p = 0.01$) and academic self-efficacy ($b = 0.36$, $p = 0.01$). Identity incompatibility also directly predicted academic self-efficacy ($b = -0.39$, $p < 0.001$), but not deep approaches to learning ($b = -0.09$, $p = 0.40$). Belonging with fellow students ($b = 0.59$, $p < 0.001$) and identity incompatibility ($b = -0.21$, $p = 0.002$) both significantly predicted discipline identification, and both showed significant indirect effects on academic self-efficacy via discipline identification (identity incompatibility: indirect effect = -0.08, $p = 0.05$, belonging: indirect effect = 0.21, $p = 0.02$). Belonging also had an indirect effect on deep approaches to learning via discipline identification (indirect effect = 0.22, $p = 0.01$) as did identity incompatibility (indirect effect = -0.08, $p = 0.05$).

Virtual time spent with faculty was a significant predictor of discipline identification ($b = 0.20$, $p = 0.02$). The indirect effects of virtual time spent with faculty on self-efficacy and deep approaches to learn via discipline identification did not reach statistical significance. However, we found that virtual time spent with students was a direct predictor of deep approaches to learning ($b = 0.20$, $p = 0.02$). Finally, we found that in-person time with faculty was associated with increases in academic self-efficacy ($b = 0.14$, $p = 0.03$).

Discussion

The results largely supported our initial predictions. Firstly, in both waves of data we found that discipline identification was positively associated with both academic outcomes in the current research — deeper approaches to learning and academic self-efficacy. As such, these results contribute to a burgeoning line of research that supports the identification-deep approaches link (Smyth et al., 2015, 2017, 2019a, b) and builds on the assertion of Simonsen and Rundmo (2020) that identification is related to academic self-efficacy. Even more importantly, our results indicate that enhancing students' levels of identification with their discipline during the emergency remote education period of early 2020 and beyond is associated with increases in those important educational outcomes.

Secondly, we found an indirect effect of belonging with other people on one's course on both academic outcomes via discipline identification. Similar to the above, these results suggest that a subjective feeling of belonging is beneficial for fostering discipline identification and, in turn, facilitating beneficial academic outcomes. Especially during the pandemic, the usage of online forums for particular modules, WhatsApp groups and other official modes of communication could have been particularly helpful in establishing a sense of belonging within the students in the present sample (Bryson & Andres, 2020). Higher education course convenors could use such technological approaches to fostering an online community and a sense of belonging with greater frequency in the future in order to enhance their students' levels of discipline identification, deeper approaches to learning, and academic self-efficacy.

Thirdly, we found that identity incompatibility was negatively associated with both discipline identification and the academic outcomes. The results of Wave 1 indicated that

---

[2] As the model was fully saturated, model fit could not be estimated.

increases in identity incompatibility were negatively associated with deeper approaches to learning and academic self-efficacy both indirectly — via decreases in discipline identification — and directly, such that incompatibility was associated directly and negatively with deep approaches to learning and academic self-efficacy. We interpret these results to mean that the experience of incompatibility was linked negatively to academic outcomes because it signifies the presence of conflicting normative pressures and expectations. If education is not highly valued within one's community, then the student might be pulled between university norms of studying and the community norms of disengaging from education (de Vreeze et al., 2018). Additionally, the presence of incompatible norms and/or behaviours could also serve to undermine students' levels of discipline identification because the new identity is rejected from the existing network of identities. This could, in turn, negatively impact students' usage of deep approaches to learning and their levels of academic self-efficacy. Throughout the pandemic, most students' living arrangements and modes of receiving tuition were changed overnight, which is likely to have had an impact on both students' sense of identification and their learning outcomes. Such changes could have also made the experience of identity incompatibility more salient for students and could have contributed to detriments in students' levels of discipline identification, usage of deep approaches to learning and sense of academic self-efficacy as our results suggested.

Although the results from the first wave suggested that experiencing identity incompatibility is detrimental to both academic outcomes, identity incompatibility was not directly associated with deep approaches to learning in our second wave of data. Thus, it is possible that identity incompatibility might be a direct predictor of only academic self-efficacy, but not deep approaches to learning. If this is the case indeed, then it is likely that identity incompatibility might serve to undermine processes which relate to one's own beliefs in achieving highly at university, but do not directly impact the way in which they learn information. Thus, in education settings, identity incompatibility might first undermine processes referring to the perception of the self in relation to learning (self-efficacy, discipline identification) and have only an indirect impact on learning processes such as deep approaches to learning via diminishing students' sense of discipline identification.

We did not find consistent evidence for the role of virtual time spent with faculty or students on either discipline identification or the academic outcomes. The results from the first wave suggested that virtual time spent with students and faculty were not related to neither academic self-efficacy and deep approaches to learning nor discipline identification. However, in the second wave, there was a direct effect of virtual time spent with students on deep approaches to learning whereas virtual time spent with faculty positively predicted discipline identification. Although the results of the second wave suggest that virtual learning activities are beneficial for students' deep approaches to learning and discipline identification, the lack of consistent evidence between waves suggest that those virtual activities were only beneficial when they were supplemented by an increase in in-person learning activities. Our explanation is that due to the return to classroom-based education students' virtual time spent with their course mates was restricted to catch-up on lectures or other asynchronous learning activities. In such activities, the student may or may not be able to interact with their fellow course mates which could explain why the increases in virtual time spent with students were only associated with deep approaches to learning. Thus, we attribute the direct effect of spending virtual time with students on increasing deep approaches to learning to the strictly learning (rather than social) function of virtual learning in the autumn term. On the contrary, spending time with faculty could have had a strictly social function for students in the Autumn term, which would explain why virtual time spent with faculty was strictly associated with increases in discipline identification.

Finally, in Wave 2, in-person contact time with faculty was associated with increases in academic self-efficacy. This effect, when contrasted with the effect of the virtual time that students spent with faculty on discipline identification, suggests that online and in-person tuition might help students in different ways — the former via cementing the student's ties to their discipline and the latter through increasing the student's belief in their capacities to perform the tasks needed. As such, virtual and in-person tuition can be mutually enhancing for the student as they might satisfy different needs or motivations in the learning process.

Theoretical contributions

The present research adds to extant theory by including novel socio-psychological (discipline identification, as well as belonging and identity incompatibility as its antecedents) and contextual (virtual and in-person time spent with faculty and students) to specifically assess their importance to established academic outcomes (deep approaches to learning, academic self-efficacy) in the 3P Model of Student Approaches to Learning. We have demonstrated the value of considering self-referent processes in predicting academic outcomes both directly (discipline identification, identity incompatibility) and indirectly (belonging, via discipline identification). We thus urge future research to carefully consider the role that these socio-psychological factors can play in the learning process of students within higher education.

We have also contributed to expanding the scope of the Theory of Self- versus Externally-Regulated Learning by considering both factors that can lead to self-regulated learning (e.g., discipline identification), but also factors that can lead to dysregulatory learning (identity incompatibility). Therefore, we urge future researchers employing this paradigm not only to include both sets of factors within their empirical investigations, but to also consider explicitly how dysregulatory factors could impact regulatory factors and vice-versa.

Finally, the current investigation was the first of its kind to test the proposed theoretical relationships between focal constructs in the context of emergency remote education necessitated by the COVID-19 pandemic. The fortunately transient nature of the pandemic changed how instruction was given overnight; however, it also prompted us to pay more attention to how changes in the immediate context can bring specific advantages technologically and instructionally. Therefore, we prompt future researchers to pay increased attention to changes in their local higher education instructional context and employ factors — such as discipline identification — that can help students with their specific needs (Easterbrook et al., 2022).

Practical and policy implications

Our findings also have specific practical implications for higher education institutions. Firstly, it is recommended that institutions pay increased importance to how changes in the learning context (i.e., the incorporation of new learning technologies, modes of examination, or changing content to be predominantly delivered online) can impact the self-referent processes of students within their departments. For example, although students going back home to their parents' homes was provoked by the COVID-19 pandemic context (Aristovnik et al., 2020), changing modes of study to primarily virtual instruction and examination can have similar effects but with implications for their feelings of identity incompatibility and discipline identification. Thus, we urge institutions to carefully consider the

impact that any changes to the learning context could have on students' socio-psychological processes as those could then impact their academic outcomes.

Our findings also demonstrate the value of fostering belonging even within virtual learning contexts. As we previously mentioned, institutions and faculty can use digital connecting technologies such as WhatsApp or similar group chat applications to facilitate social learning and creating bonds between students (Bryson & Andres, 2020). Faculty and students could also hold academic-related clubs of interest online, using popular technologies for video sharing such as Zoom or Microsoft Teams. The integrated nature and minimal-cost of these activities could help students who have to undertake virtual instruction or are precluded from attending in-person meetings due to competing commitments such as work or caring after family.

Finally, institutions can also use the results of the current research to carefully plan how to foster specific socio-psychological or academic outcomes within students by increasing the virtual or in-person time that students spent with each other or with faculty. As the results of our Wave 2 analysis suggest, spending more time in virtual settings with faculty can lead to increases in discipline identification, but spending more time in-person can lead to increases in academic self-efficacy. Although the two are not mutually exclusive, we acknowledge that students and faculty only have a finite number of hours that they can spend in contact with each other. Therefore, managing that time carefully with regard to the strategic academic or social-psychological outcome desired would be key for departments to foster either discipline identification or academic self-efficacy.

Limitations and considerations for future research

Our study also suffered from some limitations, which hamper our ability to generalise the results at hand. Firstly, the results of the second wave of measurement should be interpreted with caution due to the relatively small sample size. Samples of below 200 participants (which ours is) may lack the necessary power to meet the requirements of structural equation modelling (Kline, 2015) and thus can be underpowered. We acknowledge this as our methodological error in collecting data but wanted to show the results due to the specific timepoint at which results were collected — the autumn term was associated with some in-person teaching, but seminars and workshops for most degrees were held online. Thus, the autumn term constituted a unique learning scenario for our participants, which could have impacted their discipline identification differently than the emergency remote education which students faced in the spring term.

Secondly, the Covid-19 context also had two implications on our data. For one, due to the differences in teaching delivery between the time points, we opted against making or drawing any longitudinal conclusions about our data. This meant we could not discuss any maturation processes in our participants and thus we were not able to control for their learning rate. Two, because of the context, we cannot be sure that our results will generalise to other virtual or asynchronous learning contexts that have occurred after the COVID-19 pandemic. Future researchers would have to bear in mind that our study took place during the first two academic terms of a pandemic of unprecedented proportions. These terms were marred by uncertainty for students — the majority of whom were forced to move back home, learn using online virtual platforms, and attend examinations remotely in the spring term of the 2019–2020 academic year. Despite the easing of the pandemic restrictions in the autumn term, some students then had to adjust to the combination of virtual and in-person teaching. Thus, the novelty factor of these circumstances should be taken

into account by researchers in the future. Even though we cannot be sure whether some facets of emergency remote education would remain long after the end of the COVID-19 pandemic, students in future studies might have been using and have adapted to the use of such or additional resources by then.

Thirdly, even though all of the variables in the present study have been previously linked to students' academic achievement (Richardson et al., 2012; Veldman et al., 2019), we did not measure academic achievement in our study. This is because most UK universities opted to preserve students' achievement to their best grades achieved before or after the pandemic occurred so that students were not disadvantaged. As such, we cannot be sure whether the time-sensitive variables discussed in the present study would have been representative of students' achievement per se. Therefore, future research would have to look at the links between the variables in the present study and students' academic achievement in order to determine the extent to which these factors impact students' grades.

Finally, as a consideration for future research, it is plausible that the focal constructs in the present research could also be linked to affective or behavioural measures of learning such as academic stress (de la Fuente et al., 2021), test anxiety (de la Fuente et al., 2017), or procrastination (Smyth et al., 2019a, b). Although the present study sought to discuss the value of cognitive processes of socio-psychological nature to explaining academic processes strictly, the self-referent processes presently discussed could also be linked to increasing positive emotionality as predicted by the Theory of Self- versus Externally-Regulated Learning and decreasing maladaptive behaviours such as academic procrastination. This constitutes an exciting opportunity for future research in this area and will further promote the value of socio-psychological processes in explaining affective and behavioural learning outcomes.

Despite their limitations, our results clearly demonstrate the importance of discipline identification as being associated with key academic outcomes for university students in the UK during COVID-19. As such, we recommend that future research investigates the effect of discipline identification on these outcomes in a longitudinal manner. Doing so will build on our results by (1) Establishing an order of causality between discipline identification and its correlates which we discussed in this paper; and (2) Find ways to enhance students' levels of discipline identification in order to boost students' academic prowess. Such research would be invaluable in helping students whose education was severely altered during a pandemic of unprecedented proportions.

Conclusion

The present study sought to investigate whether belonging, identity incompatibility, virtual time spent with faculty and fellow students, and in-person time spent with faculty and fellow students predicted discipline identification and whether these factors predicted deep approaches to learning and academic self-efficacy during the COVID-19 pandemic. Using data from students in the UK at two different time periods (Spring 2020 and Autumn 2020), we found that increases in belonging with other students on one's course are associated with increases in one's levels of discipline identification, whereas increased sense of identity incompatibility is associated with lower levels of discipline identification. Identity incompatibility was also directly (and negatively) associated with academic self-efficacy and deeper approaches to learning (albeit the latter effect only occurring in the spring term). Finally, we provided some evidence that the indirect effects of belonging and

identity incompatibility on academic self-efficacy and deeper approaches to learning are mediated via discipline identification. Because of its associated benefits, course convenors could aim to foster a deeper sense of discipline identification in order for students to bear these beneficial academic outcomes in future instances of emergency remote education or in-person tuition.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10212-023-00735-z.

Data Availability Please see the datasets, the R script file containing analyses and how to undertake them, and the Supplementary Online Material to this article at https://osf.io/4FQ2Y/.

Declarations

Competing interests The authors declare no competing interests.

References

Aelenei, C., Martinot, D., Sicard, A., & Darnon, C. (2020). When an academic culture based on self-enhancement values undermines female students' sense of belonging, self-efficacy, and academic choices. *The Journal of Social Psychology, 160*(3), 373–389. https://doi.org/10.1080/00224545.2019.1675576

Amiot, C. E., De la Sablonniere, R., Terry, D. J., & Smith, J. R. (2007). Integration of social identities in the self: Toward a cognitive-developmental model. *Personality and Social Psychology Review, 11*(4), 364–388. https://doi.org/10.1177/1088868307304091

Aries, E., & Seider, M. (2005). The interactive relationship between class identity and the college experience: The case of lower income students. *Qualitative Sociology, 28*, 419–443. https://doi.org/10.1007/s11133-005-8366-1

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability, 12*(20), 8438. https://doi.org/10.3390/su12208438

Aucejo, E. M., French, J., Araya, M. P. U., & Zafar, B. (2020). The impact of COVID-19 on student experiences and expectations: Evidence from a survey. *Journal of Public Economics, 191*, 104271. https://doi.org/10.1016/j.jpubeco.2020.104271

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497. https://doi.org/10.1037/0033-2909.117.3.497

Betoret, F. D., & Artiga, A. G. (2011). The relationship among student basic need satisfaction, approaches to learning, reporting of avoidance strategies and achievement. *Electronic Journal of Research in Educational Psychology*, *9*(2). Retrieved from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1078.9956&rep=rep1&type=pdf. Accessed 6 Jul 2023

Biggs, J. B. (1988). Assessing student approaches to learning. *Australian Psychologist, 23*(2), 197–206. https://doi.org/10.1080/00050068808255604

Biggs, J. (1999). What the student does: Teaching for enhanced learning. *Higher Education Research & Development, 18*(1), 57–75. https://doi.org/10.1080/0729436990180105

Biggs, J., Kember, D., & Leung, D. Y. (2001). The revised two-factor study process questionnaire: R-SPQ-2F. *British Journal of Educational Psychology, 71*(1), 133–149. https://doi.org/10.1348/000709901158433

Bizumic, B., Reynolds, K., Turner, J., Bromhead, D., & Subasic, E. (2009). The role of the group in individual functioning: School identification and the psychological well-being of staff and students. *Applied Psychology, 58*(1), 171–192. https://doi.org/10.1111/j.1464-0597.2008.00387.x

Bliuc, A. M., Ellis, R. A., Goodyear, P., & Hendres, D. M. (2011a). Understanding student learning in context: Relationships between university students' social identity, approaches to learning, and academic performance. *European Journal of Psychology of Education, 26*(3), 417–433. https://doi.org/10.1007/s10212-011-0065-6

Bliuc, A. M., Ellis, R. A., Goodyear, P., & Hendres, D. M. (2011b). The role of social identification as university student in learning: Relationships between students' social identity, approaches to learning, and academic achievement. *Educational Psychology, 31*(5), 559–574. https://doi.org/10.1080/01443410.2011.585948

Boyle, A., Maguire, S., Martin, A., Milsom, C., Nash, R., Rawlinson, S., ... & Conchie, S. (2007). Fieldwork is good: The student perception and the affective domain. *Journal of Geography in Higher Education*, *31*(2), 299–317. https://doi.org/10.1080/03098260601063628

Brewer, M. B. (1991). The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin, 17*(5), 475–482. https://doi.org/10.1177/0146167291175001

Bryson, J. R., & Andres, L. (2020). Covid-19 and rapid adoption and improvisation of online teaching: Curating resources for extensive versus intensive online learning experiences. *Journal of Geography in Higher Education, 44*(4), 608–623. https://doi.org/10.1080/03098265.2020.1807478

Bufton, S. (2003). The lifeworld of the university student: Habitus and social class. *Journal of Phenomenological Psychology*, *34*(2), 207–234. Retrieved from https://www.proquest.com/scholarly-journals/lifeworld-university-student-habitus-social-class/docview/211502851/se-2?accountid=13828. Accessed 6 Jul 2023

Cameron, J. E. (1999). Social identity and the pursuit of possible selves: Implications for the psychological well-being of university students. *Group Dynamics: Theory, Research, and Practice, 3*(3), 179. https://doi.org/10.1037/1089-2699.3.3.179

Cameron, J. E. (2004). A three-factor model of social identity. *Self and Identity, 3*(3), 239–262. https://doi.org/10.1080/13576500444000047

Chemers, M. M., Hu, L. T., & Garcia, B. F. (2001). Academic self-efficacy and first year college student performance and adjustment. *Journal of Educational Psychology*, *93*(1), 55. https://psycnet.apa.org/doi/10.1037/0022-0663.93.1.55. Accessed 6 Jul 2023

Chickering, A. W., & Reisser, L. (1993). *Education and identity* (2nd ed.). Jossey-Bass Inc.

de la Fuente, J., Amate, J., González-Torres, M. C., Artuch, R., García-Torrecillas, J. M., & Fadda, S. (2020). Effects of levels of self-regulation and regulatory teaching on strategies for coping with academic stress in undergraduate students. *Frontiers in Psychology, 11*, 22. https://doi.org/10.3389/fpsyg.2020.00022

De la Fuente, J., Sander, P., Garzón-Umerenkova, A., Vera-Martínez, M. M., Fadda, S., & Gaetha, M. L. (2021). Self-regulation and regulatory teaching as determinants of academic behavioral confidence and procrastination in undergraduate students. *Frontiers in Psychology, 12*, 602904. https://doi.org/10.3389/fpsyg.2021.602904

De la Fuente, J., Sander, P., Martinez-Vicente, J. M., Vera, M., Garzón, A., & Fadda, S. (2017). Combined effect of levels in personal self-regulation and regulatory teaching on meta-cognitive, on meta-motivational, and on academic achievement variables in undergraduate students. *Frontiers in Psychology, 8*, 232. https://doi.org/10.3389/fpsyg.2017.00232

de la Fuente, J., Zapata, L., Martínez-Vicente, J. M., Sander, P., & Cardelle-Elawar, M. (2015). The role of personal self-regulation and regulatory teaching to predict motivational-affective variables, achievement and satisfaction: A structural model. *Frontiers in Psychology, 6*, 399. https://doi.org/10.3389/fpsyg.2015.00399

de Vreeze, J., Matschke, C., & Cress, U. (2018). Neither fish nor fowl: A perceived mismatch in norms and values between oneself, other students, and people back home undermines adaptation to university. *British Journal of Social Psychology, 57*(3), 684–702. https://doi.org/10.1111/bjso.12253

Dietrich, N., Kentheswaran, K., Ahmadi, A., Teychené, J., Bessière, Y., Alfenore, S., ... & Hébrard, G. (2020). Attempts, successes, and failures of distance learning in the time of COVID-19. *Journal of Chemical Education*, *97*(9), 2448–2457. https://doi.org/10.1021/acs.jchemed.0c00717

Dodd, R. H., Dadaczynski, K., Okan, O., McCaffery, K. J., & Pickles, K. (2021). Psychological wellbeing and academic experience of university students in Australia during COVID-19. *International*

Journal of Environmental Research and Public Health, 18, 866. https://doi.org/10.3390/ijerph1803 0866

Duff, A. (2004). Understanding academic performance and progression of first-year accounting and business economics undergraduates: The role of approaches to learning and prior academic achievement. *Accounting Education, 13*(4), 409–430. https://doi.org/10.1080/0963928042000306800

Easterbrook, M., & Vignoles, V. L. (2012). Different groups, different motives: Identity motives underlying changes in identification with novel groups. *Personality and Social Psychology Bulletin, 38*(8), 1066–1080. https://doi.org/10.1177/0146167212444614

Easterbrook, M., & Vignoles, V. L. (2013). What does it mean to belong? Interpersonal bonds and intra-group similarities as predictors of felt belonging in different types of groups. *European Journal of Social Psychology, 43*(6), 455–462. https://doi.org/10.1002/ejsp.1972

Easterbrook, M. J., Nieuwenhuis, M., Fox, K. J., Harris, P. R., & Banerjee, R. (2022). 'People like me don't do well at school': The roles of identity compatibility and school context in explaining the socioeconomic attainment gap. *British Journal of Educational Psychology, 92*(3), 1178–1195. https://doi.org/10.1111/bjep.12494

GDPR, R. (2016). 679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46. *EC (General Data Protection Regulation), online:* http://data.europa.eu/eli/reg/2016/67,9. *Accessed 6 Jul 2023*

Gore, P. A., Jr. (2006). Academic self-efficacy as a predictor of college outcomes: Two incremental validity studies. *Journal of Career Assessment, 14*(1), 92–115. https://doi.org/10.1177/1069072705281367

Gore, P. A., Jr., Leuwerke, W. C., & Turley, S. E. (2005). A psychometric study of the College Self-Efficacy Inventory. *Journal of College Student Retention: Research, Theory & Practice, 7*(3), 227–244. https://doi.org/10.2190/5cqf-f3p4-2qac-gnvj

Greenaway, K., Amiot, C. E., Louis, W. R., & Bentley, S. V. (2017). The role of psychological need satisfaction in promoting student identification. *Self and Social Identity in Educational Contexts*, 176–192. https://doi.org/10.4324/9781315746913-ch10

Haslam, S. A. (2017). The social identity approach to education and learning: Identification, ideation, interaction, influence and ideology. https://doi.org/10.4324/9781315746913-ch2

Holloway-Friesen, H. (2019). The role of mentoring on Hispanic graduate students' sense of belonging and academic self-efficacy. *Journal of Hispanic Higher Education, 20*(1), 46–58. https://doi.org/10.1177/1538192718823716

Iyer, A., Jetten, J., Tsivrikos, D., Postmes, T., & Haslam, S. A. (2009). The more (and the more compatible) the merrier: Multiple group memberships and identity compatibility as predictors of adjustment after life transitions. *British Journal of Social Psychology, 48*(4), 707–733. https://doi.org/10.1348/014466608x397628

Jetten, J., Iyer, A., Tsivrikos, D., & Young, B. M. (2008). When is individual mobility costly? The role of economic and social identity factors. *European Journal of Social Psychology, 38*(5), 866–879. https://doi.org/10.1002/ejsp.471

Kember, D., Hong, C., Yau, V. W., & Ho, S. A. (2017). Mechanisms for promoting the development of cognitive, social and affective graduate attributes. *Higher Education, 74*, 799–814. https://doi.org/10.1007/s10734-016-0077-x

Kember, D., Webster, B. J., & Chan, W. S. (2020). Refocusing the 3P model to incorporate a learning and teaching environment and graduate attributes. *Educational Psychology, 40*(5), 592–607. https://doi.org/10.1080/01443410.2020.1732304

Kievit, R. A., Brandmaier, A. M., Ziegler, G., Van Harmelen, A. L., de Mooij, S. M., Moutoussis, M., ... & Nspn Consortium. (2018). Developmental cognitive neuroscience using latent change score models: A tutorial and applications. *Developmental Cognitive Neuroscience*, *33*, 99-117 https://doi.org/10.1016/j.dcn.2017.11.007

Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford publications.

Kuh, G. D. (1995). The other curriculum: Out-of-class experiences associated with student learning and personal development. *The Journal of Higher Education, 66*(2), 123–155. https://doi.org/10.2307/2943909

Lindblom-Ylänne, S., & Lonka, K. (1998). Individual ways of interacting with the learning environment—Are they related to study success? *Learning and Instruction, 9*(1), 1–18. https://doi.org/10.1016/S0959-4752(98)00025-5

Marsh, H. W., Seaton, M., Trautwein, U., Lüdtke, O., Hau, K. T., O'Mara, A. J., & Craven, R. G. (2008). The big-fish–little-pond-effect stands up to critical scrutiny: Implications for theory, methodology, and future research. *Educational Psychology Review, 20*(3), 319–350. https://doi.org/10.1007/s10648-008-9075-6

Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology, 38*(1), 30. https://doi.org/10.1037/0022-0167.38.1.30

Nieuwenhuis, M., Manstead, A. S., & Easterbrook, M. J. (2019). Accounting for unequal access to higher education: The role of social identity factors. *Group Processes & Intergroup Relations, 22*(3), 371–389. https://doi.org/10.1177/1368430219829824

Obst, P., & White, K. (2005). Three-dimensional strength of identification across group memberships: A confirmatory factor analysis. *Self and Identity, 4*(1), 69–80. https://doi.org/10.1080/13576500444000182

Pasion, R., Dias-Oliveira, E., Camacho, A., Morais, C., & Franco, R. C. (2020). Impact of COVID-19 on undergraduate business students: A longitudinal study on academic motivation, engagement and attachment to university. *Accounting Research Journal*. https://doi.org/10.1108/arj-09-2020-0286

Pennington, C. R., Bates, E. A., Kaye, L. K., & Bolam, L. T. (2018). Transitioning in higher education: An exploration of psychological and contextual factors affecting student satisfaction. *Journal of Further and Higher Education, 42*(5), 596–607. https://doi.org/10.1080/0309877x.2017.1302563

Ramsden, P. (1979). Student learning and perceptions of the academic environment. *Higher Education, 8*(4), 411–427. https://doi.org/10.1007/bf01680529

Reay, D., Crozier, G., & Clayton, J. (2010). 'Fitting in'or 'standing out': Working-class students in UK higher education. *British Educational Research Journal, 36*(1), 107–124. https://doi.org/10.1080/01411920902878925

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138*(2), 353. https://doi.org/10.1037/a0026838

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of statistical software, 48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Ruohoniemi, M., & Lindblom-Ylänne, S. (2009). Students' experiences concerning course workload and factors enhancing and impeding their learning–A useful resource for quality enhancement in teaching and curriculum planning. *International Journal for Academic Development, 14*(1), 69–81. https://doi.org/10.1080/13601440802659494

Schunk, D. H., & Pajares, F. (2002). The development of academic self-efficacy. *Development of achievement motivation* (pp. 15–31). Academic Press.

Seyranian, V., Madva, A., Duong, N., Abramzon, N., Tibbetts, Y., & Harackiewicz, J. M. (2018). The longitudinal effects of STEM identity and gender on flourishing and achievement in college physics. *International Journal of STEM Education, 5*(1), 1–14. https://doi.org/10.1186/s40594-018-0137-0

Simonsen, I. E., & Rundmo, T. (2020). The role of school identification and self-efficacy in school satisfaction among Norwegian high-school students. *Social Psychology of Education, 23*(6), 1565–1586. https://doi.org/10.1007/s11218-020-09595-7

Smyth, L., Mavor, K. I., & Gray, L. R. (2019a). Not just who you are, but who you were before: Social identification, identity incompatibility, and performance-undermining learning behaviour in higher education. *Journal of Community & Applied Social Psychology, 29*(6), 474–491. https://doi.org/10.1002/casp.2413

Smyth, L., Mavor, K. I., Platow, M. J., Grace, D. M., & Reynolds, K. J. (2015). Discipline social identification, study norms and learning approach in university students. *Educational Psychology, 35*(1), 53–72. https://doi.org/10.1080/01443410.2013.822962

Smyth, L., Mavor, K. I., & Platow, M. J. (2017). Learning behaviour and learning outcomes: The roles for social influence and field of study. *Social Psychology of Education, 20*(1), 69–95. https://doi.org/10.1007/s11218-016-9365-7

Smyth, L., Mavor, K. I., & Platow, M. J. (2019b). Social identification and academic performance: Integrating two existing models of tertiary student learning. *Educational Psychology, 39*(3), 409–425. https://doi.org/10.1080/01443410.2018.1524853

Tajfel, H., Turner, J. C., Austin, W. G., & Worchel, S. (1979). An integrative theory of intergroup conflict. *Organizational Identity: A Reader, 56*, 65.

Tilak, J. B., & Kumar, A. G. (2022). Policy changes in global higher education: What lessons do we learn from the COVID-19 pandemic? *Higher Education Policy, 35*(3), 610–628. https://doi.org/10.1057/s41307-022-00266-0

Turner, J. C. (1991). *Social influence*. Thomson Brooks/Cole Publishing Co.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Basil Blackwell.

Veldman, J., Meeussen, L., & van Laar, C. (2019). A social identity perspective on the social-class achievement gap: Academic and social adjustment in the transition to university. *Group Processes & Intergroup Relations, 22*(3), 403–418. https://doi.org/10.1177/1368430218813442

Vignoles, V. L. (2011). Identity motives. In *Handbook of identity theory and research* (pp. 403–432). Springer, New York, NY

Vignoles, V. L., Regalia, C., Manzi, C., Golledge, J., & Scabini, E. (2006). Beyond self-esteem: Influence of multiple motives on identity construction. *Journal of Personality and Social Psychology, 90*(2), 308. https://doi.org/10.1037/0022-3514.90.2.308

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology, 92*(1), 82. https://doi.org/10.1037/0022-3514.92.1.82

WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. Who.int. (2021). Retrieved 7 April 2021, from https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020. Accessed 6 Jul 2023

Wilding, J., & Andrews, B. (2006). Life goals, approaches to study and performance in an undergraduate cohort. *British Journal of Educational Psychology, 76*(1), 171–182. https://doi.org/10.1348/000709904x24726

Vladislav H. Grozev. Sheffield University Management School, University of Sheffield, 10 Conduit Road, University of Sheffield, Sheffield, South Yorkshire, S10 1FL, UK.

Current themes of research:

Motivation. Promoting learning. Resilience. Growth amongst students in further and higher education as well as amongst employees in digital transformation contexts.

Most relevant publications in the field of Psychology of Education:

Grozev, V.H., & Easterbrook, M.J. (2022). Accessing the phenomenon of incompatibility within employed students' experience of university life. *Tertiary Education and Management, 28*(1), 241–264. https://doi.org/10.1007/s11233-022-09096-6.

Grozev, V. H., & Easterbrook, M. J. (2022). The relationships of employed students to non-employed students and non-student work colleagues: Identity implications. *Analyses of Social Issues and Public Policy, 22*(2), 712-734. https://doi.org/10.1111/asap.12315.

Matt Easterbrook. School of Psychology, University of Sussex, Brighton, UK.

Motivation. Investigates social psychological factors that contribute to inequalities in educational outcomes. Investigates ways to intervene effectively to reduce those inequalities.

Most relevant publications in the field of Psychology of Education:

Easterbrook, M. J., & Hadden, I. R. (2021). Tackling educational inequalities with social psychology: Identities, contexts, and interventions. *Social Issues and Policy Review*, *15*, 1, 180-236. https://doi.org/10.1111/sipr.12070.

Hadden, I. R., Easterbrook, M. J., Nieuwenhuis, M., Fox, K. J., & Dolan, P. (2020). Self-affirmation reduces the socioeconomic attainment gap in schools in England. *British Journal of Educational Psychology*, *90(2),* 1–20. https://doi.org/10.1111/bjep.12291.

Easterbrook, M. J., Nieuwenhuis, M, Fox, K. J., Harris, P. R., Banerjee, R. (2022). "People like me don't do well at school": The roles of identity compatibility and school context in explaining the socioeconomic attainment gap. *British Journal of Educational Psychology. Advanced Online Publication.* https://doi.org/10.1111/bjep.12494.

Easterbrook, M. J., Doyle, L., Grozev, V. H., Kosakowska-Berezecka, N., Harris, P. R., & Phalet, K. (2022). Socioeconomic and gender inequalities in home learning during the COVID-19 pandemic: examining the roles of the home environment, parent supervision, and educational provisions. *Educational and Developmental Psychologist, Advanced Online Publication.* https://doi.org/10.1080/20590776.2021.2014281.

Donna Jessop. School of Psychology, University of Sussex, Brighton, UK.

Motivation. The application of psychological theories and models to promote healthy lifestyles, pro-environmental behaviour, and well-being. Exploring the impact of student's financial circumstances on their health, well-being, and academic performance.

Most relevant publications in the field of Psychology of Education:

Jessop, D. C., Reid, M., & Solomon, L. (2020). Financial concern predicts deteriorations in mental and physical health among university students. *Psychology and Health, 35,* 196-209. https://doi.org/10.1080/08870446.2019.1626393.

Reid, M., Jessop, D. C., & Miles, E. (2020). Explaining the negative impact of financial concern on undergraduates' academic outcomes: Evidence for stress and belonging as mediators. *Journal of Further and Higher Education, 44,* 1157-1187. https://doi.org/10.1080/0309877X.2019.1664732.

Woodfield, R., Jessop, D. C., & McMillan, L. (2006). Gender differences in undergraduate attendance rates. *Studies in Higher Education, 31,* 1-22. https://doi.org/10.1080/03075070500340127.

Jessop, D. C., Herberts, C., & Solomon, L. (2005). The impact of financial circumstances on student health. *British Journal of Health Psychology, 10,* 421-439. https://doi.org/10.1348/135910705×25480.

Authors and Affiliations

Vladislav H. Grozev[1] · **Matthew J. Easterbrook[2]** · **Donna C. Jessop[2]**

✉ Vladislav H. Grozev
   v.h.grozev@sheffield.ac.uk

   Matthew J. Easterbrook
   m.j.easterbrook@sussex.ac.uk

   Donna C. Jessop
   d.jessop@sussex.ac.uk

[1] Sheffield University Management School, University of Sheffield, University of Sheffield, 10 Conduit Road, Sheffield S10 1FL, South Yorkshire, UK

[2] School of Psychology, University of Sussex, Brighton, UK