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# **Social identification and academic performance: integrating two existing models of tertiary student learning.**

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### **Abstract**

Recent research has mapped the ways social identification and normative influence affect students' self-reported learning approaches and course experience, and also, the ways in which social identification and learning approach impact directly on grades. However, there is not yet evidence for a model incorporating both these processes. The current paper aims to address this in a dataset drawn from a range of courses and disciplines at a mid-size Australian university. The data capture student demographics, social identification with the field of study, perceived learning norms and learning approaches, and examine how these map onto end of semester academic outcomes. Findings indicate support for the Bliuc (2011a) identification-to-grade, *through* learning approach model. Further, we find support for the Smyth (2015, 2017) identification-by-norm moderation model of predicting learning approaches. Added to which, we find support for a combined moderated mediation model, where the identification-norm interaction moderates the indirect effect of identification predicting grades through learning approach. Implications for course design are discussed.

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## **Social Identification and Academic Performance: Integrating Two Existing Models of Tertiary Student Learning.**

There is now a well-established body of evidence on the potential impact and utility of the examination of social influence processes in education (see, for example: Haslam, 2017; Platow, Mavor, & Bizumic, 2017). Taking a broad view, there is evidence that social identification (i.e. defining parts of the self in terms of a social group) may be: linked to protecting and bolstering student wellbeing (Bizumic, Reynolds, Turner, Bromhead, & Subasic, 2009), at least partially driving the underrepresentation of women in STEM fields (Boucher & Murphy, 2017), managing student engagement in transition (Cruwys, Gaffney, & Skipper, 2017); and increasing a sense of belonging and prosocial student behaviour (Reynolds, Subasic, Lee, & Bromhead, 2017). Focusing specifically on learning and academic performance, there is evidence that social identification and social influence processes can have impact on norms for learning behaviour (Smyth, Mavor, Platow, Grace, & Reynolds, 2015), actual learning approaches (Smyth, Chandra, & Mavor, 2018; Smyth, Mavor, & Platow, 2017), intentions to continue and student self-concept (Platow, Mavor, & Grace, 2013) and academic performance (Bliuc, Ellis, Goodyear, & Hendres, 2011a, 2011b; Reynolds, Lee, Turner, Bromhead, & Subasic, 2017).

In contributing to this growing body of literature on the ways in which consideration of social influence processes can both explain educational phenomena, as well as providing avenues for management, the current paper focuses on an integrative approach to existing models. Specifically, we examine two related models of the relationship between academic performance, social identity and learning approaches, and seek to provide first-step evidence for an integrated moderated mediation model of these effects. This approach both simplifies the path from findings to real-world applications, but also assists in building a veridical model of the real educational environment. Bliuc and colleagues (2011a, 2011b) establish a

mediation model wherein stronger social identification influences student grades through a relationship with student learning approaches (see also: Platow et al., 2013). Complementing these findings, Smyth and colleagues (Smyth, Mavor, & Platow, 2017; Smyth, Mavor, Platow, & Grace, 2017; Smyth et al., 2015) demonstrate the moderating role for peer norms in the link between identification and learning approaches. We propose an integrated model including both the mediation path through learning approaches and the moderating role for perceived norms. In this way, we provide a theoretical base from which educators can build, in planning educational interventions designed to harness social identification effects to support learning (McNeill, Smyth, & Mavor, 2017; Smyth, Mavor, Platow, et al., 2017).

### **Core Concepts**

To begin to integrate these models, we must start by defining the core concepts. The social identity approach, (Tajfel & Turner, 1986; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), proposes a model of the self as dynamic, context dependent, and comprised partly of social identities. These social identities are perceptions of the self as a member of particular social groups. Individuals can be more or less identified with a particular social group, depending on how self-defining the group membership is, as well as how invested they are in the group (Leach et al., 2008). Each of these social identities also carry norms for behaviour (an idea of what group members do, and *should* do). The social influence model from this literature (Turner, 1991) suggests that it is these norms that allow social identification to have impact on behaviour. The more strongly a group member is identified with the group, the more likely they are to act in line with what they perceive the group norms to be. Applying this concept of social identity in an educational setting, the way in which a student approaches learning in a particular context will be partially dependent on their understanding of their social group memberships and the associated norms for learning (Smyth, Mavor, & Platow, 2017).

In considering how students learn, we find the learning approaches model to be a useful framework (e.g. Biggs, 1979; Biggs, 1999; Biggs, Kember, & Leung, 2001; Biggs & Tang, 2007a, 2007b; Entwistle, 2000, 2005; Ramsden, 1991, 2003; Trigwell & Prosser, 1991; Walsh, 2007). Fundamentally, a learning “approach” is not seen as a broad individual difference but rather is fundamentally linked to a specific context and goal. These approaches can be broadly divided into two categories (Biggs, 1999). The first, deep learning, is characterised as an approach in which a student focuses on seeking connections and underlying concepts and considering how new information fits into their existing knowledge frameworks. The second, a surface approach, focuses in an instrumental way on learning only what is needed to meet task-requirements in the most efficient way possible, and is often characterised by rote memorization strategies, and selective information processing.

### **Learning Approach as Mediator**

The first body of work from which we draw our current model couches the identification-grade relationship as mediated through learning approaches. Bliuc and colleagues (2011a, 2011b) and Platow and colleagues (Bliuc et al., 2011a, 2011b; Platow et al., 2013) argued that a student more strongly identified with their discipline (i.e. a student for whom being a member of the group “students in my discipline” was central and self-defining) would be more likely to perform well in the relevant field, and to engage in a deep learning approach. Bliuc and colleagues (2011a, 2011b) demonstrated a consistent pattern where discipline-related social identification was linked positively to deep learning, and deep learning was linked to academic achievement. Although the link between social identity and academic achievement was itself not significant, the mediated effect through deep learning was supported. Similarly, the study by Platow and colleagues, found a significant link between discipline-related social identification and deep learning approach, and a link

between deep learning and academic achievement. In contrast, surface learning was not found to be significantly related to identification in any of the studies.

These studies present a consistent picture supporting a mediation model of discipline-related social identification, deep approaches to learning, and academic achievement. However, this initial work used samples that were homogenous by discipline, were heavily based on psychology students (between the studies, three data sets were psychology students, and one was architecture students), and considered only the main effect of student-discipline social identity.

### **Perceived Norms as Moderator**

In developing this model further, Smyth et al. (2015) added a normative dimension to their model of the relationship between field of study social identification and student learning approaches. This elaborated model takes into account field of study learning norms, the impact these may have on the learning approach taken and, further, the moderating effect they may have on the established identification-learning approach relationship. These authors conducted a multi-discipline, online study modelling the effect of individual differences (including personality), context variables (including perceived quality of the teaching) and the social identification and normative influence variables on learning approaches. Findings indicate that the social variables predicted learning approach, even when individual difference and learning context factors were included in the model. Further they find that the proposed two-way interaction between identification level and perceived norms was a also significant predictor of learning approach. These findings support the value of incorporating social variables in models of learning approach and provide initial evidence for the moderating effect of norms.

This model was then replicated in a larger, multidisciplinary sample (Smyth, Mavor, & Platow, 2017) and the two-way interaction between identification level and perceived

norms predicting learning approach was again demonstrated. These two sets of findings both demonstrate that the link between identification and learning approach is not a simple positive prediction. Rather, these findings suggest that this positive association is only present when the perceived norms align with the intended learning approach. When the norms were not in alignment, the identification- deep learning approach relationship is either reduced or non-significant.

The findings from Smyth and colleagues (2017; 2015) make clear the utility of normative influence and social identification variables in models of factors that determine student learning approaches. In line with previous work (Bliuc et al., 2011a, 2011b; Platow et al., 2013), the Smyth et al. data also demonstrate the positive direct effect of social identification on student deep-learning approaches. Further, the model provides evidence that this social identification main effect on learning approach is *moderated* by field of study perceived norms. That is, in education contexts, strength of identification is not the only important factor in predicting behaviour. What the field of study group membership *means*, in terms of normative positions on learning approaches, also has a clear role to play.

### **The Current Study**

While the main-effects mediation model, and the moderation model presented above are conceptually compatible, they address only partially-overlapping sections of a larger model. Where Smyth and colleagues (Smyth, Mavor, & Platow, 2017; Smyth, Mavor, Platow, et al., 2017; Smyth et al., 2015) focused on the role of perceived norms in the relationship between identification and learning approaches (but did not address academic achievement), Bliuc and colleagues (2011a, 2011b) examined the main-effect of identification and learning approaches on a measurable performance outcome without consideration of norms. As such, there is clear scope to model these two processes together; to consider both partial models in the same data-set, and then to go further and examine the

combined moderated mediation model. While we expect to be able to reproduce both the simple mediation and simple moderation models, we also intend to explore whether the moderating effect of norm might also carry through to the indirect effect on academic achievement.

It is important to be clear here that this reflects a novel path proposal. Where Smyth and colleagues (Smyth, Mavor, & Platow, 2017; Smyth et al., 2015) propose that norms moderate the identification- learning approach direct effect (where learning approach is the dependent variable; see Figure 1a), what we propose here, in considering also Bliuc's (2011a) original model, is that these norms may moderate the *indirect* effect of identification on grades that is mediated through learning approach (which represents a subset of the total possible association of identification and learning approach; see Figure 1b). This model is such that it combines both the moderation and mediation models, but also provides novel predictions for relationships. [INSERT FIGURE 1 ABOUT HERE]

Conceptually, this model bears some unpacking. Let us imagine a student who is highly identified with the field of study. According to the Bliuc mediation model (Bliuc et al., 2011b), this student's strong identification is likely to be associated with better academic performance, at least partially mediated through learning approach. That is, students' strong identification will be associated with a deeper learning approach, which, in turn, can partially drive better academic outcomes. According to the Smyth et al. model (2015, 2017) - which, to date, has not considered performance- this student's strong identification would not *inevitably* lead to deep learning approaches. According to this model, the association between strong identification and deep learning approaches is moderated by whether the student perceived fellow students' values and actions to be supporting of deep learning approaches.

What we seek to examine here is the extent to which these perceived norms might similarly moderate the mediation effect identified by Bliuc, in that, the alignment of



perceived norms to deep learning approaches might similarly moderate the strength of the indirect effect. While we expect a mediation effect of identification to performance through learning approach in general, we would expect this indirect effect to be stronger in cases where a student perceives deep learning norms. The current study tests this moderated mediation model in a multidisciplinary sample at a moderately sized Australian university, operationalising “academic performance” in terms of final course scores.

### **Hypotheses**

- (1) In line with Bliuc et al. (2011a), we expect that the relationship between identification and academic performance will be partially mediated through learning approach
- (2) In line with Smyth et al. (Smyth, Mavor, & Platow, 2017; Smyth et al., 2015), we expect that the relationship between identification and learning approach will be moderated by perceived norms
- (3) Further, we expect that these two models are compatible, such that the moderated mediation model shown in Figure 1 will be a good fit for our data and will demonstrate a stronger mediation effect for those students who perceive more deep-learning oriented norms and a weaker mediation effect for those who perceive more surface-oriented learning norms.

### **Method**

#### **Participants**

Participants were 357 students, sampled as part of a larger (N ~800) study of field of study social identification and learning approaches. The current sample were students (49.8% female; two participants did not report a gender) from a dozen undergraduate courses of two broad types (life & humanities-based (63%); and mathematics-based (37%)) at an Australian university. The analyses reported here are conducted on the subset of participants who consented to providing their academic performance data, but this sample is otherwise

considered equivalent to the larger pool. The two samples were compared on key variables, using ANOVA. No significant differences were found in variables from the final model. As such, both datasets were considered equally representative of the larger pool.

Given that the analysis approach used relies on multiple regression with expected coefficients of multiple correlation between 0.15 and 0.45 (that would require a sample between 95 and 340, per Knofczynski & Mundform (2008)) and bootstrap resampling of indirect effects (which is very robust to small sample sizes; Hayes, 2013), the current set of 357 was considered appropriate.

Participants were recruited through approaching all students in attendance during lecture time early in the course. Participants completed a pen-and- paper survey within a few weeks of the beginning of semester and course scores were collected after the conclusion of the course. Ages of participants ranged from 17 to 59 years ( $M = 21.22$ ) and 68% of participants indicated English was their first language. The current sample included students ranging from one to seven years into their studies (median = 2<sup>nd</sup> year, 228 (64%) were post 1<sup>st</sup>-year).

## Measures

Participants responded to a pen-and-paper survey during class time. The survey consisted of several subscales, and was structured as a series of statements. Participants indicated their degree of agreement or disagreement with all statements on a seven-point Likert scale (ranging from strongly disagree to strongly agree). The research was approved by the lead author's institution's Human Research Ethics Committee.

**Person-level factors.** Demographic variables, including age, gender, linguistic background and area of study were recorded.

**Identification.** Students' social identification was measured using a seven-item identification scale that is widely used to measure social identification (for a summary, see:

Haslam, 2004). Items included: “I have a lot of respect for students in my field of study”; “I would RATHER NOT tell other people that I am a student in my field of study” (r). In the current data, the scale was acceptably reliable ( $\alpha = .74$ ).

**Learning approaches and norms.** Twelve items adapted by Smyth and colleagues (2015) from the revised version of the Study Process Questionnaire (SPQ; Biggs et al., 2001) were used to measure students’ learning approaches. Six items were used for each of deep and surface learning approaches (e.g., “I spend a lot of my free time finding out more about interesting topics dealt with in class” (deep); “I only study seriously those topics that I know will be assessed” (surface)). Surface learning approach items were reverse coded and all twelve items were compiled, yielding a single score where positive scores indicate a net tendency toward deep learning approach and negative scores indicate a net tendency toward surface learning. Although we are using a difference score here to measure approach direction, the two sides of the scale are not equi-potent. Therefore the zero-point of the scale is not meaningful and it is not possible to say that a mean score above zero is “deep learning” – just that higher scores show more tendency to deep learning and lower scores show less deep learning and more surface learning. We also acknowledge that deep and surface learning are, conceptually, independent constructs and not the anchor points of a continuum (Biggs, 1987), the specific behaviours we have used as learning approach measures are incompatible, practically speaking. This leaves the student with what amounts to a polarised choice and we therefore consider this approach to calculating the norm “tendency” appropriate. In the current data, the learning approach tendency scale (i.e. All twelve learning approach items, with surface items reverse coded) fell above the recommended reliability level ( $\alpha_{LAV} = .79$ ).

Six items were used to assess participants’ perceptions of field of study student norms. These items were adapted from the SPQ are designed to reflect the approaches

captured by the SPQ, but are worded positively and have been previously used in tertiary populations (Smyth et al., 2015). There were three items for each kind of norm (e.g., “Most students in my field of study prefer to focus on learning efficiently by memorizing key information and minimizing study time” (surface); “Most students in my field of study prefer to focus on understanding content fully and integrating new information with what they already know” (deep)). In a similar manner to the approach “tendency” above, these six items were then used to construct a single “tendency of student norm” measure. In the current data, the learning norm tendency scale (i.e. All six norms items, with surface norms reverse coded) fell above the recommended reliability level ( $\alpha_{NMval} = .70$ ).

**Grade data.** The final outcome in the model examined was academic performance, as operationalized by final course score. We acknowledge the potentially problematic association between actual student learning and course grades (e.g. Shepard, 2000), but note that a focus on grades as the outcome is common in this literature (e.g. Richardson, Abraham, & Bond, 2012), particularly as they are easily quantifiable and are, ideally, a representation of student learning in the course. Generally, research indicates that deep learning approaches are associated with higher grades (e.g. Mattick, Dennis, & Bligh, 2004; Richardson et al., 2012), as we might logically expect. As such, and with a view to examining the ways the moderation model proposed by Smyth and colleagues (Smyth, Mavor, & Platow, 2017) might integrate with the mediation model proposed by Bliuc (Bliuc et al., 2011b), we chose to operationalise performance variables as final course score (/100).

Given the operationalisation of this identification as being related to the overall field of study and our dependent variables being operationalised as a grade score for a particular course, it is important to examine whether the course in which the student is being grade forms part of their self-nominated “field of study”. In our data, we find that the incidence of course/field mismatch was about 17% (60 participants). We re-ran our model without these

participants and there was no significant change in the pattern of effects. We also compared the match/mismatch samples, in terms of the key variables (using Mann-Whitney tests, as t-test would be inappropriate in such uneven cell sizes) and found no significant differences. On this basis, we have chosen to retain the full data set.

## **Results**

See Table 1 for descriptive statistics and correlations between variables. Of note, there is no significant zero-order relationship between identification level and final grade. In line with Zhao and colleagues (Zhao, Lynch Jr, & Chen, 2010), we do not consider this problematic in the context of pursuing a mediation model. The majority of the individual differences are also excluded from this and further analysis. In our data, gender was distributed in a way too highly correlated with field of study type to allow for the inclusion of both in the model, without multicollinearity. Given our intent to build on precedent work that includes field of study, we retained this in the model, at the cost of gender. Year of studies was simply excluded as it was not significantly related to any of the core variables and was non-normally distributed. Given the potential theoretical association between year of studies and levels of identification, we examined potential differences by year and find that there are no significant differences in identification either by ordinal year, or when categorised into 1<sup>st</sup> vs later-year groups. [INSERT TABLE 1 ABOUT HERE]

To test our hypothesised models, we used Hayes' (2013) SPSS macros for simple mediation, moderation and moderated mediation models using regression analysis. These macros can test indirect effects, as well as models where the indirect effect also varies with levels of a moderator.

### **Indirect Effects of Identification**

Hypothesis 1 predicted that, in line with Bliuc and colleagues (2011b) learning approaches would partially mediate the relationship between identification with the field of

study and academic performance (as operationalised by course grades). We tested this hypothesis with the Hayes (2013) macro for simple mediation (Model 4 in the PROCESS macro). We regressed the grade variable onto levels of identification with the student-perceived field of study (our independent variable) and learning approach tendency (our mediator, using 5,000 bootstrapped samples of the indirect effect. Simple mediation coefficients can be found in Table 2. Results indicate that, in line with hypothesis 1, the indirect effect of identification through learning approach tendency (.69) was significant in predicting grades [.22, 1.40]. [INSERT TABLE 2 ABOUT HERE]

### **Conditional Effects of Perceived Norms**

Hypothesis 2 predicted that, in line with Smyth et al., the direct relationships between identification levels and learning approach tendency would be moderated by perceived learning norm tendency. To test this, we used the Hayes (2013) simple moderation model (Model 1 in the PROCESS macro). We regressed the learning approach tendency variable onto levels of identification with the student-perceived field of study (our independent variable), norm tendency (our moderator) and their interaction. Results for this tests of simple moderation can be found in Table 3. Results indicate that, in line with hypothesis 2, there is a significant main effect of identification ( $B = .53, p < .001$ ), norm tendency ( $B = .22, p < .001$ ) and also a significant interaction ( $B = .16, p < .05$ ). The form of the interaction is shown in Figure 2. [INSERT FIGURE 2 ABOUT HERE] Simple slopes indicate that, while both slopes are significant, the slope of the identification-learning approach effect for those who perceive more deep-oriented norms was steeper ( $B = .76, p < .001$ ) than for those who perceived more surface-oriented norms ( $B = .30, p < .05$ ). Similarly, when considered in the other direction, the slope of the identification-norm tendency effect for low identifiers ( $B = .10, ns$ ) was non-significant, whereas the slope representing for high identifiers was significant ( $B = .34, p < .001$ ). [INSERT TABLE 3 ABOUT HERE].

### **Conditional Indirect Effects of Identification**

Hypothesis 3 predicted that the indirect effects would be moderated by the perceived learning norms of the field of study identity, such that the indirect effect would be stronger for students who perceived more deep-learning oriented norms, than for those who perceived more surface-learning oriented norms. To test this hypothesis, we used a moderated mediation model (Model 7 in the PROCESS macro) developed by Hayes (2013). As well as confirming the overall moderation and mediation effect still hold, we use the index of moderated mediation to test hypothesis 3 (see Figure 1). The index of moderated mediation is a measure of the extent to which the conditional indirect effects are significantly different to one another at different levels of the moderator (Hayes, 2015). We regressed the grade variable onto identification with the field of study (the independent variable) and learning approach tendency (the mediator) with perceived norm tendency entered as the first stage moderator. Language background, field of study category and age were included as covariates, owing to their strong correlation with grades in the current data. The model was run with 5,000 bootstrapped samples for both the indirect effect and the index of moderated mediation.

When running this model, the indirect effect was significant and positive, but small for individuals who perceived more surface- oriented norms [.05, .99] and somewhat stronger for students who perceived deep-learning oriented norms [.30,1.97]. Further, the index of moderated mediation was significant [0.03, 0.54] (see Table 4). Significant main effects were found for our core variables of identification ( $B=.56, p<.01$ ), and norm tendency ( $B=.22, p<.01$ ) as well as the age covariate ( $B=.05, p<.05$ ) in predicting learning approach tendency. Main effect indicators of grade included our core variable of learning approach tendency ( $B = 1.18, p<0.01$ ) (but no direct effect of identification,  $B = -.60, p=.48$ ). In addition, significant covariates in predicting grade were field of study category ( $B = 3.73, p<.01$ , where the

positive effect indicated that participants in human-focused fields received higher grades than those in mathematics-focused fields), and language background ( $B = -4.07$ ,  $p < .01$ , where negative effects indicate those from a non-English speaking background performed more poorly). [INSERT TABLE 4 ABOUT HERE]

### Discussion

The current paper sought to combine existing models of the identification-grade relationship, taking both the mediating role for learning approaches and the moderating role for perceived peer norms into account. In a multi-disciplinary sample of Australian tertiary students, we examined the simple mediation model, the simple moderation model and the combined moderated mediation model. Findings were in line with hypotheses, in that learning approach partially mediated the identification-grade relationship, perceived norms moderated the identification- learning approach relationship and the index of moderated mediation provided supportive evidence for the combined moderated mediation model (wherein the indirect effects were significantly different from one another at differing levels of the moderator).

The current findings are in line with both Bliuc and colleagues (2011a, 2011b) and Smyth and colleagues (Smyth, Mavor, & Platow, 2017; Smyth, Mavor, Platow, et al., 2017; Smyth et al., 2015) and go further, by providing evidence for combining these two models. Taken together, these findings shed light on the complexity of the ways in which social identification might have impact on student learning behaviour and academic performance. Specifically, we demonstrate that student norms moderate the indirect effect of student field-of-study identification on academic performance, through learning approaches.

### Specific Findings

**Simple mediation.** Our replication of the simple mediation model, linking identification to academic performance via learning approaches, provides further supportive evidence for this proposed mechanism. That is, that at least part of the explanation for more



strongly identified students performing better is that there is a link between stronger identification as a student in a field of study and the adoption of a deep learning approach and, by and large, taking a deeper learning approach is often linked to better performance

**Simple moderation.** Our replication of the simple moderation model reinforces the claim that we need to take a more nuanced view of the role of social identification and consider the normative position of the group with which the student is identifying in trying to predict their learning approaches. While we replicate the positive main effect, we also demonstrate a moderation effect, whereby increased identification is significantly more strongly predictive of deeper learning approaches, when the norms are seen to be supportive of deep learning.

**Moderated mediation.** Finally, we have some supportive evidence for a novel model, in which we propose that the indirect effect of identification on grades via learning approach is itself moderated by the perceived norms. This evidence suggests the utility of a more integrated model that captures both the normative moderation and learning approach mediation in predicting student academic performance. The nature of the effects- that the indirect effect is stronger when students perceive deep learning norms- also opens a discussion on the ways in which course context might inform student norms and the flow-on effects on student learning and outcomes. In our view, the most parsimonious explanation for this pattern of effects lies in the fact that student norms are derived from a real-world educational situation in our data. As such, we would expect the norms to be reflective of the kinds of learning that would be strategically advantageous in the current course. Or, at least, reflective of the kind of learning that the educators has suggested will likely lead to good performance. This conceptual explanation of the model is in keeping with the constructive alignment model of influencing learning approaches (Biggs & Tang, 2007b; Walsh, 2007;

Wang, Su, Cheung, Wong, & Kwong, 2013) and, as such, present an opportunity to further integrate the psychological and educational literature.

### **Limitations**

These findings are an important first step in considering normative influence models of academic performance. However, there are some attributes of this particular study that bear consideration in planning to pursue this line of enquiry. First, our data were a single-time collection of student identification, norm perceptions and learning approaches with a later collection of grades. There is evidence in the literature (e.g. Platow et al., 2013) that student identification levels and learning approaches are sensitive to course experience and may change over time. As such, it would be worthwhile tracking student identification, learning approaches, normative perceptions and the timing of assessment pieces, if a clear model of the way these relate to academic performance is to be derived.

Second, in the current study, we only consider norms derived from other students. In a tertiary education setting, however, there are several other sources of information on how “We” in a particular field of study approach learning and knowledge. Per Smyth and colleagues (Smyth, Mavor, Platow, et al., 2017), it would be of use to consider the effect of normative positions communicated by educators and their impact on student field-of-study identities and related learning approaches. This is particularly the case as our current evidence could be seen as consistent with the operation of a constructive alignment model of educator influence underlying the real-world peer norms we measure.

Finally, we measured academic performance in terms of course scores. Actual course grades are acknowledged in the literature as being less well associated with actual learning and less associated with a deeper learning approach (which tend to be associated with more qualitative learning outcomes, such as complexity of understanding, student satisfaction; Lizzio, Wilson, & Simons, 2002). These findings are predominantly found in courses that are

not constructively aligned (Biggs & Tang, 2007b). There is also the matter of course- and field-of-study- based anchoring of scoring (as evidenced by the association we find between field of study type and overall score). Future studies will need to consider sampling entire course cohorts to allow standardisation of scores (as course-based z-scores) categorising courses on the basis of their constructive alignment, or seeking alternative measures of student learning.

### **Implications and Applications**

Taken together, these data have important implications for both the social psychological and educational literature. We demonstrate here, for the first time, a more nuanced model of the interaction between identification and perceived norms in predicting behaviour. While the social psychological literature establishes the main effects and simple interaction in prediction behavioural intentions and, ultimately behaviour (see, for example: Fekadu & Kraft, 2002; Smith & Louis, 2008; Smyth et al., 2018; Smyth et al., 2015; White, Smith, Terry, Greenslade, & McKimmie, 2009), we have now provided evidence that the interaction may, in fact, moderate the *indirect* effect on behavioural outcomes (academic performance) *through* behavioural intentions (learning approaches as captured by the SPQ).

In the context of education, we have also provided some crucial preliminary evidence of the ways in which social identification and social influences in the classroom can have very real consequences on measurable student performance outcomes. This knowledge allows us to consider ways in which we, as educators, can manage the normative influence process and boost student performance. Where the bulk of the learning approaches literature examines student individual differences and learning environment, this line of research now offers a third vector through which we can shape the ways in which students engage with material and, ultimately, learn.

The current data provides clear support for a moderated mediation model of the relationships between identification, norms, learning approach and grades. There is also still scope to consider what educators might do with this model in a very practical sense. By providing replication evidence for both Smyth et al. (2017; 2015) and Bliuc et al. (2011a, 2011b), models, we strengthen the case for using these models of social influence to understand students choice of approach to learning. Further, we provide preliminary suggestions for educators in how to best influence their classes in the right direction. Since the course context can influence the normative perceptions of students, educators may have scope to structure their lessons and teaching approaches in ways that can influence what has been demonstrated (Smyth, Mavor, Platow, et al., 2017) to be a significant driver of student learning behaviour. The new evidence for the moderated mediation model goes further, and allows us to map how these normative processes can influence concrete performance outcomes, opening the door for norm-based interventions to improve student performance.

**Table & Figure Captions**

Table 1: Means and Correlations, Model Variables

Table 2: Simple mediation model

Table 3: Simple moderation model

Table 4: Combined moderated mediation model

Figure 1: Conceptual model

Figure 2: Form of the simple moderation

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**Table 1: Correlations among and descriptives for key variables**

	MEAN (SD)	AGE	Field	ID	LA Val	Nm Val
Age	21.22 (4.91)	-				
Field of study		-.10	-			
Field of study identification (ID)	5.23 (.75)	-.07	.01	-		
Learning approach tendency (LA Val)	0.66 (1.49)	.14**	-.11*	.28**	-	
Learning norm tendency (Nm Val)	-.26 (1.46)	.01	-.12*	.17**	.32**	
Grade	72.21 (11.22)	-.06	-.20**	.01	.14*	-.003

\*  $p < 0.05$ ; \*\*  $p < .01$

**Table 2: Simple Mediation Model (PROCESS model 4)**

Outcome: Learning approach tendency. $R^2_{\text{model}}=.14$ , F(4,324) = 12.97, p<.001						Outcome: Grade $R^2_{\text{model}}=.08$ , F(5,323) = 5.91, p<.001				
	B	se	t	p	CI	B	se	t	p	CI
Constant	-4.16	.69	-6.05	<.001	[-5.51,-2.81]	78.22	5.58	14.13	<.001	[67.25,89.19]
Identification	.61	.10	5.83	<.001	[.40,.81]	.54	.84	-.65	.52	[-2.2,1.11]
Discipline	.51	.17	2.90	<.01	[.16,.85]	2.92	1.36	2.15	<.05	[.25,5.60]
Age	.57	.02	3.48	<.001	[.03,.09]	-.22	.13	-1.72	.09	[-.47,.03]
Language	.34	.18	1.94	.053	[.01,.69]	-4.21	1.36	-3.10	<.05	[-6.88,-1.54]
Learning Approach Tendency	-	-	-	-	-	1.13	.43	2.66	<.01	[.30,1.98]
Indirect effect	-	-	-	-	-	.69	.29	-	-	[.22,1.40]

**Table 3: Simple Moderation Model (PROCESS model 1)**


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$R^2_{\text{model}}=.44, F(6,334) = 13.21, p<.001; \Delta R^2_{\text{interaction}}=.01, F(1,334) = 4.83, p<.05$

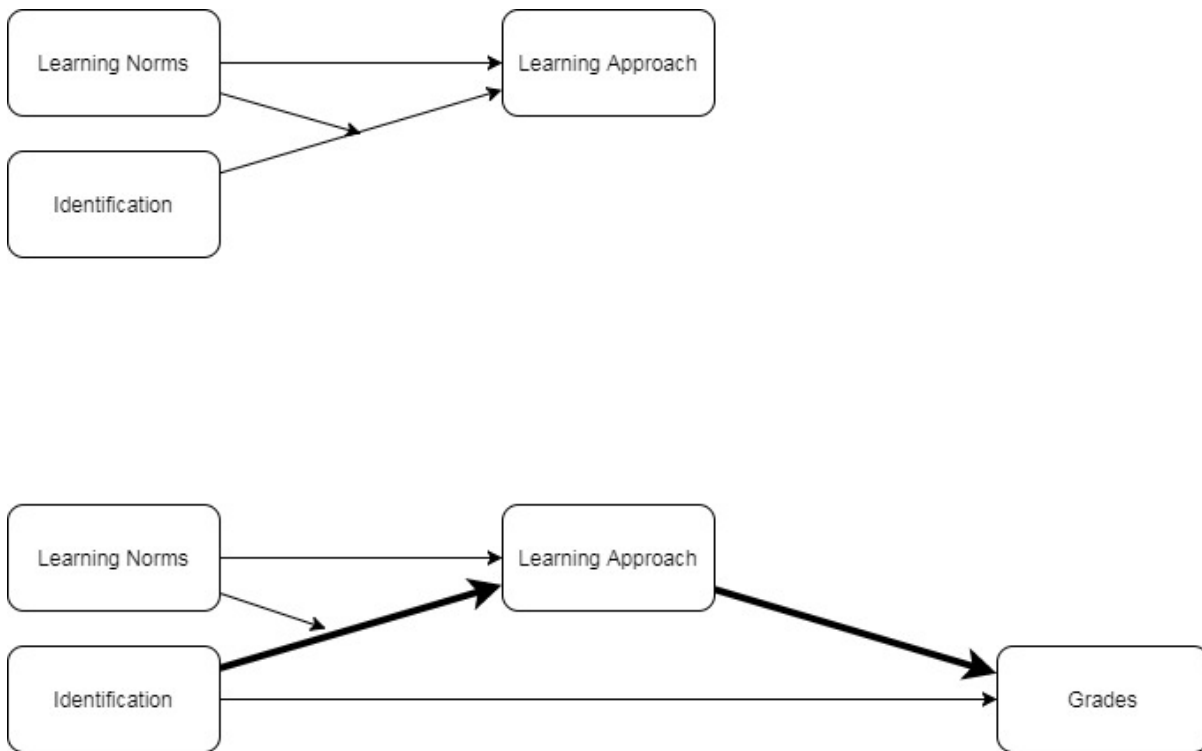
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	B	se	t	p	CI
Constant	-.63	.39	-1.61	.11	[-1.4,.14]
Identification	.53	.10	5.34	<.001	[.34,.73]
Norm tendency	.22	.05	4.18	<.001	[.12,.33]
Discipline	.33	.16	2.07	<.05	[.02,.65]
Age	.05	.02	2.87	<.01	[.02,.08]
Language	.13	.17	.79	.43	[-.19,.45]
Identification x norm	.16	.07	2.20	<.05	[.02,.30]

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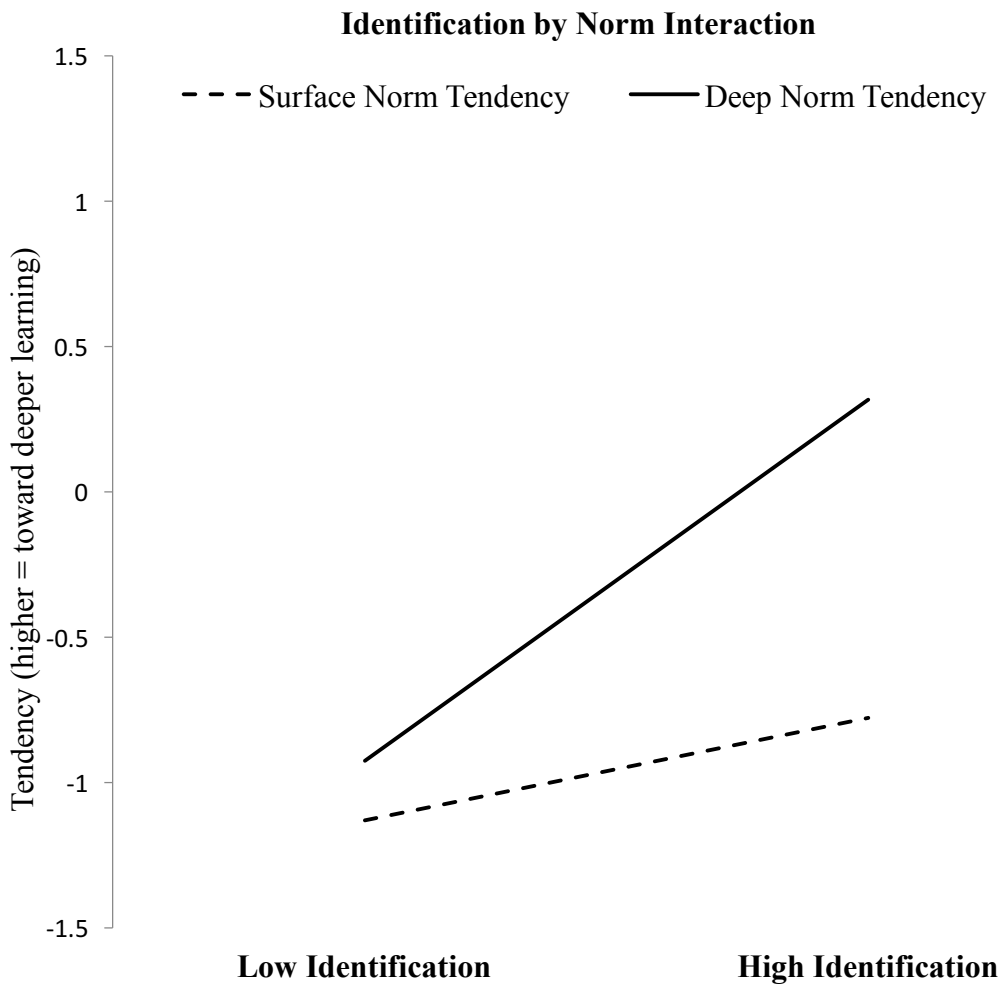
**Table 4: Conditional indirect effects on grades (PROCESS model 7)**

<b>Outcome: Learning approach tendency. <math>R^2_{\text{model}}=.20</math>,</b>										
<b>F(6,313) = 12.91, p&lt;.001</b>						<b>Outcome: Grade <math>R^2_{\text{model}}=.09</math>, F(5,314) = 6.52, p&lt;.001</b>				
	B	se	t	p	CI	B	se	t	p	CI
Constant	-.69	.41	-.170	.09	[-1.49,.11]	72.95	3.21	22.72	<.001	[66.63,79.27]
Identification	.56	.11	5.30	<.001	[.35,.76]	-.61	.85	-.71	.48	[-2.28,1.07]
Norm Tendency	.22	.06	3.93	<.001	[.11,.32]	-	-	-	-	-
Interaction	.16	.07	2.23	<.05	[.02,.31]	-	-	-	-	-
Discipline	.40	.18	2.26	<.05	[.05,.74]	3.73	1.37	2.71	<.01	[1.02,6.43]
Age	.05	.02	2.77	<.01	[.01,.08]	-.13	.14	-.97	.33	[-.40,.14]
Language	.16	.17	.95	.34	[-.18,.51]	-4.07	1.37	-.297	<.05	[-6.76,-1.38]
Learning Approach Tendency	-	-	-	-	-	1.18	3.21	22.72	<.001	[.33,2.02]
Indirect effect -1SD Norm	-	-	-	-	-	.37	.23	-	-	[.05,.99]
Indirect effect mean Norm	-	-	-	-	-	.66	.28	-	-	[.21,1.35]
Indirect effect +1SD Norm	-	-	-	-	-	.95	.41	-	-	[.30,1.97]



**Figure 1: Conceptual moderated mediation model**





**Figure 2: Form of the identification x norm interaction (simple moderation model)**