Not just who you are, but who you were before: Social identification, identity incompatibility and performance-undermining learning behavior in higher education

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Abstract

The current study builds on links between academic social identification and learning behaviors, and extends these models by also considering the level of compatibility between the student identity and the pre-existing self-concept. This is a crucial extension, in the context of broadening access to higher education and fostering belonging and learning in non-traditional students. Further, where previous work focused on learning behaviors that enhance performance (often learning approaches), we also consider performance-undermining behaviors (self-handicapping and procrastination). These effects are explored in survey-responses from an undergraduate student sample ($N = 121$) from a UK and broader European sample. Participants were predominantly female (69%) and native English speakers (87%). Three models of the relationships between these variables were tested using Mplus. Results indicate that performance undermining behaviors are predicted by identity incompatibility, but not identification level; deep learning approaches are predicted by identification level, but not identity incompatibility. This provides first evidence that identity incompatibility is not just a moderator of the identification-learning relationships but, in fact, a separate identity process for consideration. We also present initial evidence for a mediation model, where in the identity variables are related to procrastination and self-handicapping via learning approaches.

Keywords: Social identity; Higher Education; Self-handicapping; Procrastination; Identity Compatibility

Not just who you are, but who you were before: Social identification, identity

incompatibility and performance-undermining learning behavior

In the pursuit of socially-based interventions for improved higher education outcomes, there is now plenty of evidence available on the clear links between academic social identity and performance-enhancing academic behaviors, particularly learning approaches. (Smyth, Mavor, Platow, Grace, & Reynolds, 2015; Smyth, Chandra, & Platow, 2017; Smyth, Chandra, & Mavor, 2018; Bliuc, Ellis, Goodyear, & Hendres, 2011a, 2011b; Mavor, Platow, & Bizumic, 2017; Platow, Mavor, & Grace, 2013). What is as yet underexplored, however, is the role for self and social identity in performance-*undermining* behaviors, in particular self-worth protection strategies, such as deliberate underachievement, defensive expectation and self-handicapping (SWP; Cano, Martin, Ginns, & Berbén, 2018), that often involve academically risky behaviors, in the pursuit of impression management goals. That is, in adopting a self-worth protecting strategy, students often undermine their own performance, while trying to ensure they and others continue to perceive themselves positively. A clearer understanding of how academic social identity relates to these performance-undermining behaviors will lend itself to a more veridical understanding of the real learning environment and suggest pathways to effective interventions. The current paper examines two SWP-type performance-undermining factors on the now-established path between social identity and learning approaches: procrastination (Steel, 2007) and self-handicapping behaviors (Jones & Berglas, 1978). While academic social identification may lead to an intention to take a deep learning approach, we argue that procrastination and self-handicapping can derail these processes, leading ultimately to the lower final exam grades (Wesley, 1994) and fewer successful degree completions (Vossensteyn et al., 2015) reported in the literature.

In exploring the social antecedents and consequences of these performance-undermining strategies, it is further necessary to explore another dimension of the experience of academic social identity: its compatibility with a student's existing set of social self-perceptions. As universities aspire to remove barriers and broaden participation in tertiary education (e.g. Schinske et al., 2017), the diversity, complexity and variability in the commencing student's self-concept will increase markedly as a result of the broader array of backgrounds and experiences from which students will come. This issue of social identity compatibility has already been shown to impact on the psychological adjustment of transitioning university students (Jetten, Iyer, Tsivrikos, & Young, 2008). One of the novel aspects of this paper, then, is to explore the effects of academic social identity alongside identity (in)compatibility, in predicting both performance-enhancing factors (learning approaches) and performance-undermining factors (procrastination and self-handicapping).

The academic social identity and learning approaches model

The basic framework of the model we are exploring here is the recent, but now well-established, links between academic social identity and approaches to learning. The notion of academic social identity is based on the social identity perspective (Tajfel & Turner, 1986; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) which asserts a model of the self that incorporates social as well as personal aspects, and which is dynamic and context-dependent. Academic social identities, therefore, are those aspects of the self that are shared with others in an academic context, such as those based on discipline or field of study, or more generally as student.

A number of recent papers have applied this social identity perspective to the learning approaches framework (Smyth et al., 2015; McNeill, Smyth, & Mavo, 2017; Bliuc et al., 2011a, 2011b; Platow et al., 2013). Learning approaches can be usefully divided into deep and surface learning (Biggs & Tang, 2007a, 2007b). In taking a deep learning approach, the

student seeks to make connections between concepts, integrate new material and attend to the purpose of the learning material. This is often contrasted with a surface learning approach which is more focused on instrumental aspects of learning, efficiently meeting task requirements, and may involve rote learning strategies. Both deep and surface learning can be considered performance-enhancing strategies, even though surface learning has been demonstrated to be associated with reduced academic outcomes (e.g. Chamorro-Premuzic & Furnham, 2008). This is because, in a naturalistic education context, assessment tasks often reward a memorization approach (Biggs & Tang, 2007b), making surface learning approaches a strategic choice made with the intention of enhancing performance in some contexts.

Researchers have argued that a deep learning approach is more likely to have implications for a developing academic identity and vice versa (Platow et al., 2013), and that academic social identity is linked with academic achievement through deep learning (Bliuc et al., 2011a, 2011b). We would expect that these basic patterns would be replicated in this study. In addition, we plan to examine the relationship of identity incompatibility with these learning approaches.

Identity incompatibility

The academic social identity does not exist in a vacuum but arises in the context of each individual's network of other social and personal identities, with which it should ideally be integrated (Amiot, De la Sablonniere, Terry, & Smith, 2007). Students may feel an incompatibility because of the social or cultural background they have come from. These possible feelings of difference in the educational environment in contrast to the background one is used to, have been suggested to lead to one of two outcomes: change and transformation, or feelings of insecurity and uncertainty (Reay, 2005). One significant issue in the UK university context is social class (Jetten, Iyer, & Zhang, 2017; Sutton Trust,

Papademetriou, Somerville, & Sumption, 2008). A variety of qualitative studies, often

focusing on working-class students attending elite universities, have elaborated on this

concept (Granfield, 1991; Lawler, 1999; Ostrove & Cole, 2003; Skeggs, 1997; Stewart &

Ostrove, 1993), describing alienation, shame, displacement and ambivalence as outcomes of

this perceived feeling of discontinuity. There is also evidence that race and ethnic differences

lead to reliable differences in outcomes in universities, even after a number of potential

confounding factors are accounted for (Richardson, 2008; Woolf, McManus, Potts, & Dacre,

2013).

A feature of our approach is that we are focusing on the psychological experience of

identity incompatibility rather than the specific demographic characteristic of the student *per

se*, and we argue that this experience can be based on a range of experienced social identity

differences (race, ethnicity, age, social class etc.). Previous studies have tended to focus on

the effect of social class or ethnicity or another category. The approach taken here is to

develop a scale of identity incompatibility which would allow for a range of possible sources

of clashing identities, and allow us to test the association of that experienced clash with both

performance-enhancing behaviors (learning approaches) and performance-undermining

behaviors (SWP strategies).

Performance-undermining academic behaviors

Of the myriad of ways a student could undermine their own performance, two of the

most consistently reported are procrastination (irrationally delaying in starting or completing

an intended task, despite knowing one would be worse-off; Steel, 2007) and self-

handicapping behaviors (creation of impediments to own performance that involves

evaluation; Jones & Berglas, 1978). Both these behaviors constitute self-worth protection

strategies (SWP; Cano et al., 2018) used by students under threat (real or perceived) of

failure. Procrastination and self-handicapping are rife in academic contexts (Kachgal,

Hansen, & Nutter, 2001), and have established links with academic performance (Boon, 2007; Gadbois & Sturgeon, 2011; Midgley, Arunkumar, & Urdan, 1996; Schwinger & Stiensmeier-Pelster, 2012; Steel, 2007; Urdan, 2004; Urdan & Midgley, 2001) and learning approaches (e.g.Schwinger, Wirthwein, Lemmer, & Steinmayr, 2014). What we argue here is that these behaviors, in common with more classic learning behaviors, have links to academic social identity and identity incompatibility.

The self-concept relevance of SWP strategies is already established, with regard to the individual self-concept, specifically: low self-esteem (Covington, 1992; Eronen, Nurmi, & Salmela-Aro, 1998; Ferrari, 1991), high public self-consciousness (Shepperd & Arkin, 1989), low self-determination (Knee & Zuckerman, 1998), performance-avoidance goals (Midgley et al., 1996) and self-concept clarity (Gadbois & Sturgeon, 2011; Thomas & Gadbois, 2007). There is currently some evidence that self-handicapping is a behavior intended to protect individual self-esteem (Berglas & Jones, 1978) and also other evidence suggesting it is a way to regulate public self-presentation (Covington, 1992; Kolditz & Arkin, 1982; Strube, 1986). This literature, however, underplays the fundamentally social processes at play here. As yet, it is not clear if this behavior stems chiefly from a drive for positive *self*-perception or can be considered largely an impression-management technique for the benefit of observers. This lack of clarity then leaves unresolved the question of whether it is more useful to think of SWP strategies as mainly related to personal self-esteem or might more properly be considered a *social* process. Similarly, while procrastination has been described as an attempt to manage one's emotional reaction (Berzonsky, 1992), deliberate procrastination could also be readily (and publically) adopted by a self-handicapper to discount ability attributions following a failure outcome, particularly to save face (e.g. Beck, Koons, & Milgrim, 2000; Ferrari & Tice, 2000). While it is beyond the scope of the current paper to address whether SWP is largely about self-perceptions or impression management, we consider this an open

door to the possibility that there may be clear, mutable, social drivers of these behaviors that it would benefit the literature on positive educational change to consider. In the current context of examining the role for self and social identity in driving performance-undermining academic behaviors, we argue that SWP strategies are- at least partially- socially driven.

The current study

In summary, as well as modelling possible pathways between academic social identification and performance-undermining strategies through learning approaches, we examine the possibility that performance-undermining behavior may be at least partially driven by identity-incompatibility related feelings of "otherness" in academic settings. The aims of the current study are twofold. In the first instance, we seek to refine approaches to academic social identity somewhat further by developing and including a measure of the extent to which the academic social identity is compatible with existing self-networks. In the second, we seek to establish where SWP strategies fit in the established identity-learning approach model. The broad model of relationships we plan to test is in Figure 1, although we note that, as a number of these relationships are speculative, the final model will be determined by analyses. Given the exploratory aims, hypotheses are as follows:

1) We expect to replicate the relationships found in the literature: academic social identity will be positively related to deep learning, and have a non-significant or negative relationship with surface learning.

2) We expect identity incompatibility and performance-undermining behaviors will be related, such that incompatibility will be related to higher levels of SWP strategies.

3) We expect deep learning approaches to be associated with decreased procrastination and self-handicapping, while surface learning is associated with increases.

4) We speculate that the two identity measures (incompatibility and identification with the student identity) may influence the uptake of SWP strategies via established links with learning approaches. Given the piecemeal evidence that identity is related to learning approaches and other evidence that learning approaches are related to SWP strategies, we speculate that this may be a mediation relationship

5) We further speculate that the two identity measures may interact (for example. such that levels of incompatibility might amplify the identification- SWP link) in their associations with levels of SWP strategies.

[INSERT FIGURE 1 NEAR HERE]

Methods

Participants

Participants were 121[1] college and university students (38 male, 83 female) studying across 56 disciplines at around 65 UK institutions, and a handful overseas. Mean age was 32.75 years, 87% of participants indicated English as their first language. Participants completed an online survey via Qualtrics. To increase size and diversity of the sample, students were recruited either through snowball sampling, or through a targeted online panel of UK-based undergraduate students. Students recruited through snowball sampling (N=38) had a mean age of 21.36 years, while students recruited through the online panel (N=83), had a mean age of 38.09 years (2 participants did not disclose age)[2]. Students recruited via snowball sampling were offered the chance to win one of several £20 and £40 Amazon vouchers, while those recruited via the online panel (via Pure Profile) received a small reward (in the order of £1 - £1.50) from the panel company.

Measures

Discipline-related Social Identification. To measure the extent to which participants identified with the other students on their program of study, a 12-item scale first developed by Cameron (2004) was used. Items included "I often think about the fact that I am a [program] student". The scale was designed to be applicable for a range of identities and has been previously applied in an educational setting, (e.g. Cameron, 1999; Marcouyeux & Fleury-Bahi, 2011). It was designed to measure three components of identity (centrality, ingroup affect, ingroup ties), as well as well as a broad social identity construct, however in our data a single-factor solution fit best. The reliability of the single-factor scale in the current data was robust ($\alpha = .86$).

Learning Approaches. To measure deep learning and surface learning approaches, we used a shortened version (8 items) of the "revised two-factor Study Processes

Questionnaire" (SPQ, Biggs et al., 2001). To prioritize the novel elements of identity incompatibility and self-handicapping, we used a short scale for deep and surface learning. The items were split into two 4-item sub-scales - one measuring deep approaches to learning ("I work hard at my studies because I find the material interesting") and one measuring surface approaches ("I see no point in learning material which isn't likely to be in the exam"). A factor analysis with oblique rotation was conducted on the 8-item scale to make sure it factors as expected. Items loaded onto two clear factors (eigenvalues = 2.80, 1.82) measuring the deep- and surface-learning constructs. The reliability of the two scales were $\alpha = .79$ (deep) and $\alpha = .58$ (surface). The reliability for the surface learning scale was lower than ideal, but, the factor analysis supports the scale distinction, and item analysis did not suggest dropping any items.

Performance-undermining (Self-Worth Protection) Strategies. The extent to which students engaged in SWP strategies were measured with two sub-scales: self-handicapping and procrastination. Self-handicapping was measured with, a context-adapted version of the Academic Self-Handicapping Strategies Scale (Urdan & Midgley, 2001). This scale has been successfully used before in a similar undergraduate sample to predict self-concept clarity and learning strategies (Thomas & Gadbois, 2007). The 5-item measure includes items such as: "Some students purposely don't apply themselves at university so that if they don't do well, they can say it is because they didn't try. How true is this of you?". In the current data, this was reliable ($\alpha = .89$). Academic procrastination, was measured with the 25-item Academic Procrastination Scale (APS; McCloskey, 2011) which has been used successfully on a sample of university students (Mohammadi, Tahriri & Hassaskhah, 2015). Items included "Tests are meant to be studied for just the night before" and "I usually allocate time to review and proofread my work" (r). For the current sample, the scale was highly reliable ($\alpha = .96$).

Identity Incompatibility. A scale for identity incompatibility was developed to measure the subjective feeling of incompatibility between one's home social environment and university social environment. Across 10 items, the scale was intended to measure the extent to which an individual feels the need to put up a facade when at university (e.g. "…I have gone to certain lengths to manipulate the way I am perceived by others and therefore conceal part of my pre-university identity"), feelings of being an outsider or a duality in the identities and values between home and university environments. The scale included two reverse-coded items, which factor analysis suggested did not load with the other items and were therefore removed from analysis. On removal of the two items, the new 8-item scale, based on the data in the current study, had robust reliability ($\alpha = .86$). See appendix A for the full scale.

In addition to the above scales, an Impostor scale (Clance, 1985) was included, in case the measure of identity incompatibility did not hold up psychometrically. Since the incompatibility scale operates satisfactorily, the imposter scale is not discussed further.

Results

All scale means, standard deviations and correlations are shown in Table 1. Consistent with previous research, academic identification was positively correlated with a deep learning approach ($r = .43$, $p < .01$) and negatively with a surface learning approach ($r = -.23$, $p < .05$), academic procrastination ($r = -.40$, $p < .01$) and academic self-handicapping ($r = -.29$, $p < .01$). Identity incompatibility was found to correlate with a surface learning approach ($r = .26$, $p < .01$), academic procrastination ($r = .47$, $p < .01$) and academic self-handicapping ($r = .41$, $p < .01$).

Testing moderation effect for academic social identity and identity incompatibility

We speculated that the two identity measures might interact in predicting learning approaches or procrastination and self-handicapping. To test this, we used the PROCESS

macro (Model 1; Hayes, 2013) with deep learning, surface learning, academic procrastination and academic self-handicapping, in turn, as dependent variables. Results for these four analyses showed no significant interaction effects. Since there is no evidence to support moderation models, the following analyses consider parallel mediation path models only.

Mediation Path Models

Although we had some specific expectations, a number of pathways in the model were exploratory. Therefore, we used an empirical process of model reduction (simplifying the model in stages, by eliminating insignificant terms) in this analysis. Path models were tested using path analysis with MPlus (version 7; Muthén & Muthén, 1998-2017) with all scales as measured variables. The current sample size did not allow for a full SEM approach, but, as our variables were all measured with validated scales (with the exception of the identity incompatibility scale, validated using EFA here), the use of pure path analysis is not problematic. For the sake of simplicity and ease of interpretation, no covariates were included in the current modelling.

Base parallel model (Model 1). We first examined a fully saturated path model (i.e. the model with zero degrees of freedom, where there are as many parameters as there are expected variances, covariances and means of the observed variables), closest to the conceptual model (Figure 1). The two identity variables (social identification and identity incompatibility score) were allowed to correlate as exogenous IV's. The two learning approach variables acted as mediators, and academic procrastination and academic self-handicapping acted as the outcomes in parallel. The model allowed for correlated residuals between the two learning approaches and between procrastination and self-handicapping. Paths were saturated going downstream, such that the two learning approaches predict the outcome measures, and the identity variables predict all four downstream variables. As a

fully saturated regression model, there were no degrees of freedom and therefore we cannot evaluate overall model fit. However, we used the significance of individual paths as a guide for model trimming. The full outcomes of model 1 are in Table 2.

Restricted parallel model (Model 2). After removing the non-significant direct paths, we tested the trimmed model in MPlus. The trimmed model represented a good fit (χ^2 (4) = 7.56, p=.11; CFI=.98; RMSEA = .09; SRMR= .05; AIC=2126.6). Since the Chi-square was non-significant in this nested model, the trimmed model is not a worse fit than the original saturated model and was therefore a satisfactory representation of the data. The full outcomes of Model 2 are in Table 3. For ease of interpretation, only standardized weights for significant paths are shown in Figure 2.

Restricted two-step mediation model (Model 3). Since academic procrastination can be interpreted as a specific form of academic self-handicapping, we also considered an alternative model in which procrastination operates as a further mediator of academic self-handicapping. By examining the direct paths to self-handicapping (not passing through procrastination) we can ask how the identification and learning approach measures are related to self-handicapping in ways other than the procrastination scale. We repeated the model-trimming process described above to get a testable two-step mediation model, but for brevity we report only the trimmed version as Model 3. This model is also a good fit for the data (χ^2 (4) = 4.60, p=.33; CFI=.99; RMSEA = .04; SRMR= .03; AIC=2123.6). Full outcomes of Model 3 are shown in Table 4. Standardized weights for significant paths are in Figure 3.

These two restricted models (Models 2 and 3) are not nested models and so we cannot analytically compare their χ^2 values or fit statistics. Descriptively, the fit statistics for Model 3 are better but both models represent a good fit. The AIC statistic does allow comparison of non-nested models, and these suggest that Model 3 is a slightly more informative model, but the difference is small.

Total and indirect effects

Given that the two identity variables have direct and indirect pathways leading to both academic procrastination and self-handicapping, it is useful to consider the specific indirect pathways through which the identity variables might be associated with these outcome measures. All indirect effects are shown for Model 2 (Table 5) and Model 3 (Table 6).

Discussion

The current study set out to do two things. First, to add a new dimension to examinations of academic social identity in education, by considering the extent to which this identity might be incompatible with existing identity networks. Second, to examine how self-worth protection strategies fit into the established social identity-learning approach model. The associated novel contributions are, therefore, preliminary evidence for a new identity incompatibility scale that we think will be of use in the education context and a model of how academic social identity is related to performance undermining academic behaviors. Key findings from an exploratory, iterative modelling process were threefold:

1) Performance undermining SWP behaviors (procrastination and self-handicapping) as well as a surface learning approach, are predicted by increasing identity incompatibility, but are either negatively related (surface learning) or not directly associated with identification level (procrastination and self-handicapping, indicating full mediation of the identification-procrastination link through the learning approach variables) ;

2) Deep learning approaches are predicted by academic identification level, but are not significantly related with identity incompatibility;

3) All four indirect effects of identity variables on procrastination and self-handicapping via surface learning approaches were significant, whereas only a

negative effect of academic identification on procrastination via deep learning

approaches was significant.

These findings have clear implications for both theory and application that utilizes a social

identity-based model of educational behavior.

Identity incompatibility

While identity incompatibility was intended as a nuance in examining academic social

identification effects, the current findings suggest that these are two, independent, identity-

related effects. In our modelling we find that, while we replicate the identification-deep

learning path from the literature (Bliuc et al., 2011a, 2011b), we find an entirely different set

of relationships for identity incompatibility. Identity incompatibility is a significant direct

predictor of increased surface learning approaches, increased procrastination and increased

self-handicapping. The mechanisms of these relationships, however, are not immediately

clear in our data and this leaves a clear path for future research. We also find significant

indirect effects of identity incompatibility on the SWP strategies *via* surface learning

approaches. This is a significant finding, particularly in the contemporary environment of

increasing diversity in tertiary education. Where literature to date has focused on the

importance of increasing identification as a student (Bliuc et al., 2011a) or a member of the

discipline (Smyth et al., 2015) we now present evidence that, in cases where this new identity

is incompatible with existing perceptions of the self, there are a number of undermining

effects associated with attempts to internalize this new identity. These findings provide initial

quantitative support for the derived link between qualitative accounts of feelings of insecurity

and displacement when a student enters an educational social environment at odds with their

home social environment (Granfield, 1991; Lawler, 1999; Ostrove & Cole, 2003; Reay, 2005;

Skeggs, 1997; Stewart & Ostrove, 1993), and the feelings of inadequacy and impostorism

described in the procrastination and self-handicapping literature (Aitken, 1982; Ellis & Knaus, 1977; Want & Kleitman, 2006).

The notion that compatibility has impact on the outcomes of internalizing a new identity is not new (Amiot et al., 2007; Haslam et al., 2008; Iyer, Jetten, Tsivrikos, Postmes, & Haslam, 2009; Jetten et al., 2008; McNeill, 2017). In fact, evidence already exists that the compatibility of the student identity with the existing set of selves has important flow-on effects for student wellbeing (Iyer et al., 2009). The advance here is that we now present clear evidence that the flow-on effects generalize beyond wellbeing and self-perception and into the learning and academic performance domains. In an educational climate that celebrates the importance of granting opportunities to those who may not originally have received them, the current findings reinforce the importance of broadening the range of research into the difficulties faced by students coming to university from increasingly diverse backgrounds. Our evidence suggests that a student's perception of being stuck between two (or more) identities predicts a greater engagement in academic procrastination and academic self-handicapping, which we know can negatively impact on achievement (e.g. Midgley et al., 1996; Urdan, 2004; Urdan & Midgley, 2001). As such, this constitutes a clear call for education literature to engage even more deeply with social psychological concepts. The theoretical and practical utility of considering identification with a salient, task-relevant social identity are now established. The current findings, however, highlight the need to consider this identification, not in a vacuum, but in the context of the larger network of selves each student brings to the classroom (Leach et al., 2008).

Performance-undermining behaviors

Building on previous findings, the results relating to our first aim not only support the established capacity of academic identification to predict deep and surface learning approaches (Bliuc et al., 2011a, 2011b), but also go further, to establish clear links between

social identity variables and performance undermining behaviors, specifically procrastination and self-handicapping. We also further underscore the capacity of surface learning to predict academic procrastination and academic self-handicapping (Gadbois & Sturgeon, 2011; Howell & Watson, 2007; Thomas & Gadbois, 2007). Given the established empirical link between academic procrastination, academic self-handicapping and lower academic achievement (Boon, 2007; Gadbois & Sturgeon, 2011; Midgley et al., 1996; Schwinger & Stiensmeier-Pelster, 2012; Steel, 2007; Urdan, 2004; Urdan & Midgley, 2001), our current results have obvious relevance to educational policy, particularly in terms of trying to support non-traditional students in pursuing high levels of performance.

Limitations

One key limitation of the current paper is the size of the sample, and this is borne out in the marginal significance of a number of our indirect effects and the non-significance of our expected interaction effects. While we were sufficiently powered to generate a number of interesting and indicative findings, a larger sample would allow the testing of the full, moderated mediation model derived from our literature review. However, that we were able to demonstrate some of our model in this sample speaks to the strength and robustness of both the identity incompatibility scale, and the effects found.

A second consideration to be borne in mind is that the current study did not measure actual academic performance. While the evidence for the relationships between learning approaches and academic performance (e.g. Drew & Watkins, 1998) and SWP strategies and academic performance (e.g. Boon, 2007) is clear, a full examination of our current hypotheses would include an examination of the indirect effects of the identity variables on academic performance via both the performance-enhancing and performance-undermining behaviors measured.

Finally, our data represent a single-time snapshot of the student experience and the patterns of relationships between identity and learning behaviors. Learning behavior (Biggs, 1987), social identification (Turner et al., 1987) and identity networks (Linville, 1987) are all conceptualized as dynamic, context dependent and subject to accommodation and assimilation effects. As such, future studies may wish to examine these effects in a longitudinal dataset to tease apart how the relationships identified change and flow over time, as students progress through their degree programs and, ultimately, transition into the workplace.

Conclusion

In sum, the current findings suggest the value of examining identity incompatibility in education, particular in the context of broadening access to higher education. They also highlight the bi-directional nature of social influence on learning. That is, it is not just a matter of being able to *boost* learning through social interventions but, as demonstrated here, it is also perfectly possible for social influence to drive performance- undermining behaviors. What we have now is an expanded agenda for possible identity interventions that address both student recruitment and adjustment, as well as learning behavior in the classroom.

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Notes.

1) As the effects to be investigated are novel, there was no precedent effect size from which to conduct a power analysis. There is also no consensus on approaches to calculating required sample size for interactions (which we explicitly hypothesize). While we acknowledge this is a small sample, being under-powered is a false *negative* risk and the fact that we report significant effects speaks to the fact that we have sufficient power to detect these.

2) The two samples were examined for equivalence using t-tests and chi-squared tests. Results indicated no significant differences between groups on most key variables. Panel participants were significant older, (t (117) =6.12, *p*<.001,) and the snowball sample had a higher proportion of female respondents, ($\chi^2(1) = 6.27$, I<.05). Kolmogorov-Smirnov tests were used to compare the distributions on the main model variables. For academic self-handicapping, the panel sample had a broader distribution, K-S D(38,83) = 1.91, p=.001. For academic identification, the panel sample was slightly broader, K-S D(38,83) = 1.66, p=.008. These results suggest that the use of the two sampling methods increased the sample and also broadened the range of responses available for analysis, without introducing any substantial heterogeneity.

Table 1: Scale characteristics: means, standard deviations and correlations.

	M (SD)	1	2	3	4	5
1. Academic Identification	5.07 (.97)	-				
2. Surface Learning	4.95 (1.18)	-.23*	-			
3. Deep Learning	3.98 (1.18)	.43**	-.01	-		
4. Academic Self-Handicapping	2.19 (1.08)	-.29**	.37**	-.15	-	
5. Academic Procrastination	3.50 (1.25)	-.40**	.40*	-.49**	.48**	-
6. Identity Incompatibility	3.66 (1.27)	-.13	.26**	-.04	.41**	.47**

Table 2: Parameter estimates for the base parallel model (Model 1)

Outcome	Predictor	Estimate	Std. Estimate	S.E.	Est./S.E.	p
Direct paths						
Deep Learning						
	Academic ID	0.53**	0.43	0.10	5.20	<.001
	ID incompatibility	0.02	0.02	0.08	0.21	0.84
Surface Learning						
	Academic ID	-0.24*	-0.20	0.11	-2.31	0.02
	ID Incompatibility	0.21*	0.23	0.08	2.67	0.01
Procrastination						
	Deep Learning	-0.46**	-0.43	0.07	-6.28	<.001
	Surface Learning	0.29**	0.28	0.07	4.22	<.001
	ID Incompatibility	0.37**	0.37	0.06	5.82	<.001
	Academic ID	-0.13	-0.10	0.09	-1.46	0.14
Self-handicapping						
	Deep Learning	-0.06	-0.07	0.08	-0.76	0.45
	Surface Learning	0.23*	0.25	0.08	3.08	0.01
	ID Incompatibility	0.28**	0.32	0.07	4.07	<.001
	Academic ID	-0.18	-0.16	0.10	-1.86	0.06
Correlations						
Academic ID	ID Incompatibility	-0.15	-0.13	0.11	-1.38	0.17
Deep Learning	Surface Learning	0.12	0.11	0.11	1.14	0.25
Procrastination	Self-handicapping	0.16*	0.22	0.07	2.32	0.02

Note: Standard errors and probabilities are based on unstandardized estimates.
* denotes *p*<.05, ***p*<.001

Table 3: Parameter estimates for the restricted parallel model (Model 2)

			Std.			
Outcome	**Predictor**	**Estimate**	**Estimate**	**S.E.**	**Est./S.E.**	**p**
Model: (χ^2 (4) = 7.56, p=.11; CFI=.98; RMSEA = .09; SRMR= .05; AIC=2126.6).						
Direct paths						
Deep Learning						
	Academic ID	0.52**	0.43	0.10	5.21	<.001
Surface Learning						
	Academic ID	-0.24*	-0.20	0.11	-2.31	0.02
	ID Incompatibility	0.21*	0.23	0.10	2.66	0.01
Procrastination						
	Deep Learning	-0.48**	-0.45	0.07	-7.33	<.001
	Surface Learning	0.32**	0.30	0.07	4.64	<.001
	ID Incompatibility	0.37**	0.38	0.06	5.89	<.001
Self-handicapping						
	Surface Learning	0.26**	0.29	0.08	3.50	<.001
	ID Incompatibility	0.29**	0.34	0.07	4.15	<.001
Correlations						
Academic ID	ID Incompatibility	-0.15	-0.13	0.11	-1.38	0.17
Deep Learning	Surface Learning	0.12	0.11	0.11	1.15	0.25
Procrastination	Self-handicapping	0.19*	0.24	0.08	2.49	0.01

Note: Standard errors and probabilities are based on unstandardized estimates.

* denotes *p*<.05, ****p<.001

Table 4: Parameter estimates for the restricted two-step mediation model (Model 3)

			Std.			
Outcome	**Predictor**	**Estimate**	**Estimate**	**S.E.**	**Est./S.E.**	**p**
Direct paths						
Deep Learning						
	Academic ID	0.52**	0.43	0.10	5.21	<.001
Surface Learning						
	Academic ID	-0.24*	-0.20	0.11	-2.31	0.02
	ID Incompatibility	0.21*	0.23	0.08	2.66	0.01
Academic Procrastination						
	Deep Learning	-0.50**	-0.47	0.07	-7.62	<.001
	Surface Learning	0.32**	0.30	0.07	4.64	<.001
	ID Incompatibility	0.37**	0.38	0.03	5.87	<.001
Academic Self-handicapping						
	Procrastination	0.25*	0.29	0.08	3.18	0.01
	Surface Learning	0.18*	0.20	0.08	2.41	0.02
	ID incompatibility	0.19*	0.22	0.07	2.59	0.01
Correlations						
Academic ID	ID incompatibility	-0.15	-0.13	0.11	-1.38	0.17
Deep Learning	Surface Learning	0.12	0.11	0.11	1.14	0.25

Model: (χ^2 (4) = 4.60, p=.33; CFI=.99; RMSEA = .04; SRMR= .03; AIC=2123.6).

Note: Standard errors and probabilities are based on unstandardized estimates.

* denotes *p*<.05, ***p*<.001

Table 5: Indirect effect parameter estimates for Model 2.

Predictor	Via	Outcome	Estimate	Std. Estimate	S.E.	Est./S.E.	p
Academic identification							
	Deep Learning						
		Procrastination	-0.25**	-0.19	0.06	-4.25	<.001
	Surface Learning						
		Procrastination	-0.08*	-0.06	0.04	-2.07	0.04
		Self-handicapping	-0.06	-0.06	0.03	-1.93	0.05
ID Incompatibility							
	Surface Learning						
		Procrastination	0.07*	0.07	0.03	2.31	0.02
	Surface Learning						
		Self-handicapping	0.06*	0.07	0.03	2.12	0.03

Note: Standard errors and probabilities are based on unstandardized estimates.

* denotes *p*<.05, **p<.001

Table 6: Indirect effect parameter estimates for Model 3.

Predictor Via Outcome	Estimate	Std. Estimate	S.E.	Est./S.E.	p
Academic identification					
Deep Learning					
Procrastination	-0.26**	-0.23	0.06	-4.30	<.001
Deep Learning Procrastination					
Self-handicapping	-0.07*	-0.06	0.03	-2.56	0.01
Surface Learning					
Procrastination	-0.08*	-0.06	0.04	-2.07	0.04
Self-handicapping	-0.05	-0.04	0.03	-1.67	0.10
Surface Learning Procrastination					
Self-handicapping	-0.02	-0.02	0.01	-1.73	0.09
ID Incompatibility					
Surface Learning					
Procrastination	0.07*	0.07	0.03	2.31	0.02
Surface Learning					
Self-handicapping	0.04	0.05	0.02	1.79	0.07
Procrastination					
Self-handicapping	0.09	0.11	0.03	2.80	0.01
Surface Learning Procrastination					
Self-handicapping	0.02	0.02	0.01	1.87	0.07

Note: Standard errors and probabilities are based on unstandardized estimates.
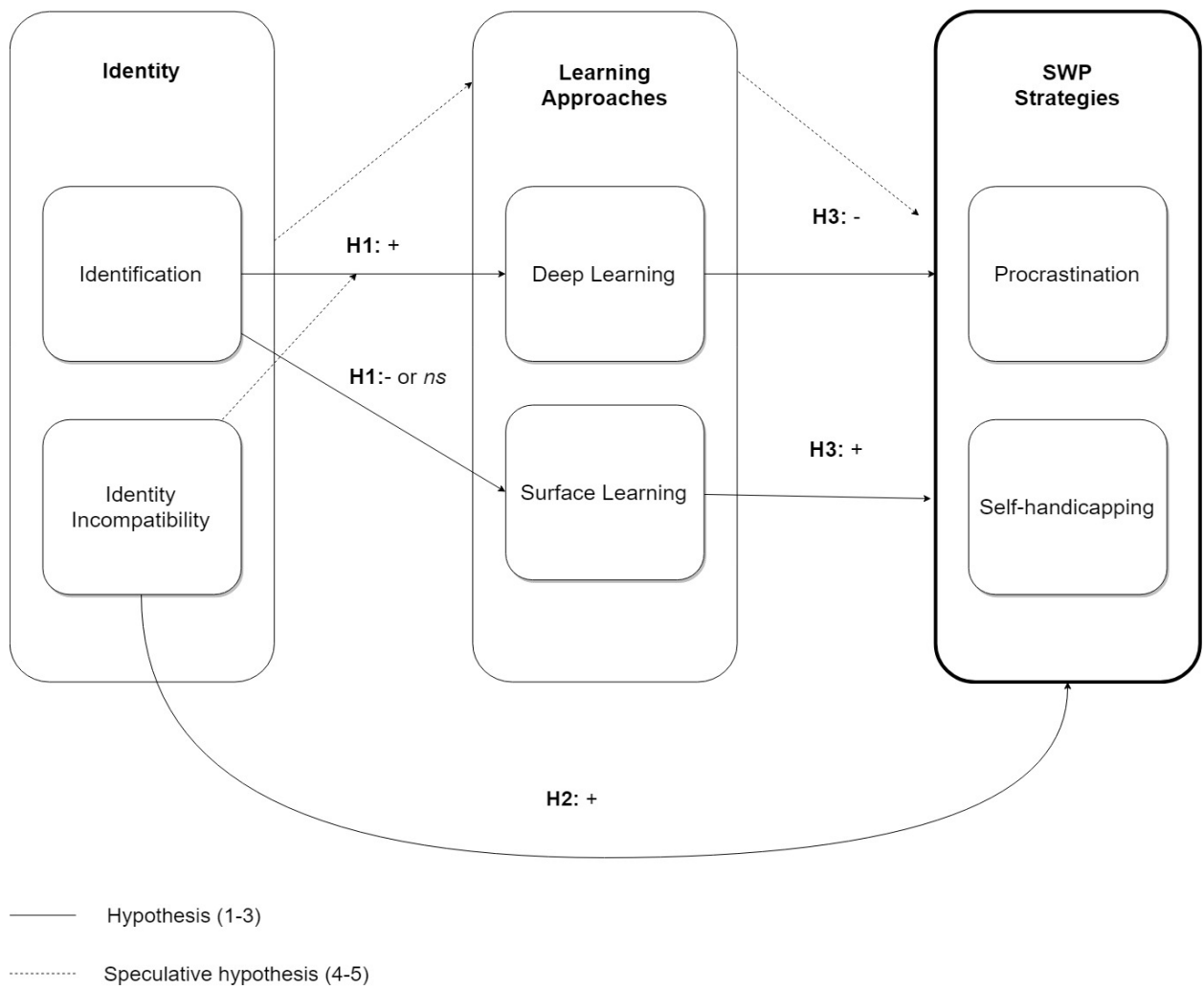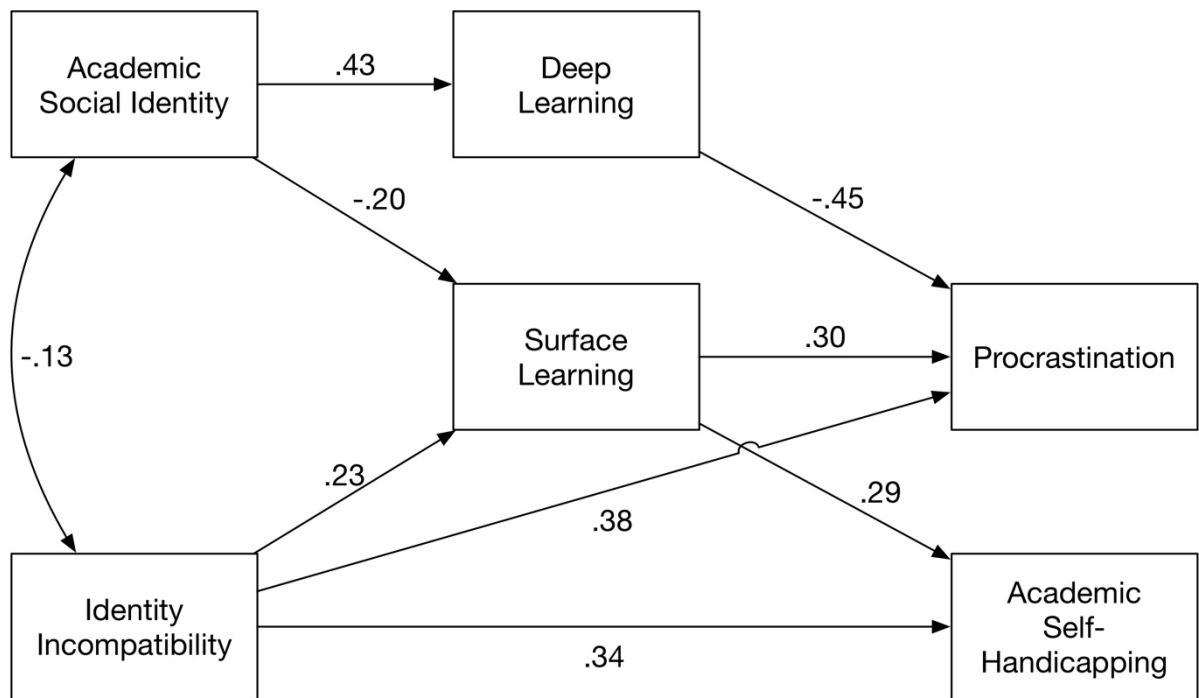
* denotes *p*<.05, **p<.001

Figure 1: Conceptual model

Figure 2: Path model with standardized significant (*p*<.05) paths for the restricted parallel model (Model 2). NB: Figure also includes correlation between identity variables (*ns)*.
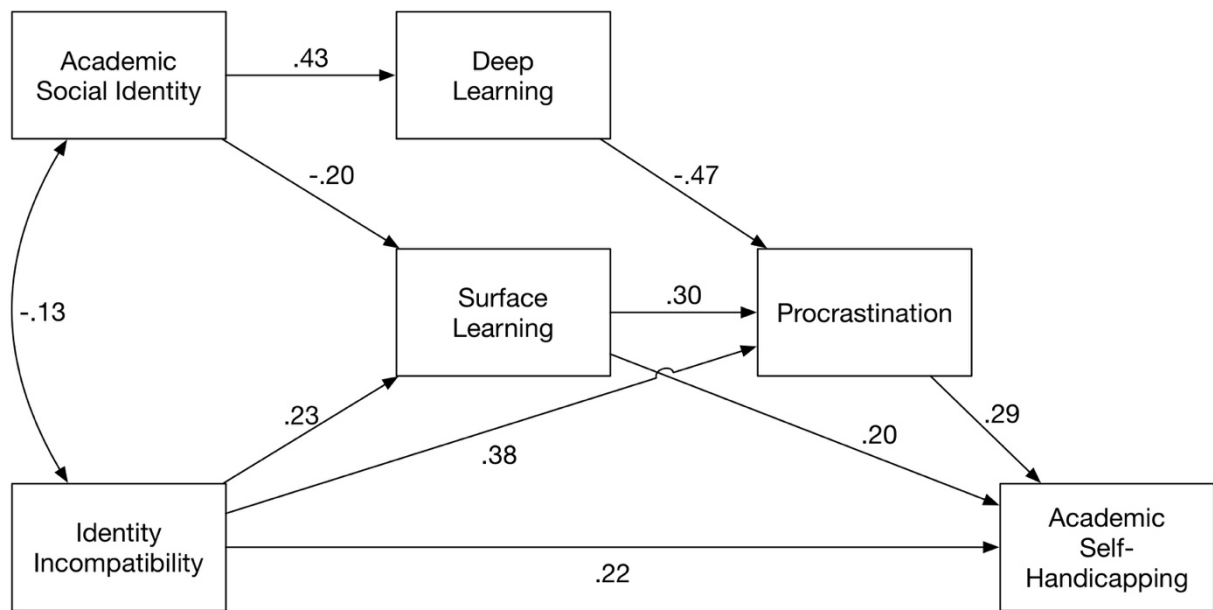
Figure 3: Path model with standardized significant (*p*<.05) paths for the restricted two-step mediation model (Model 3). NB: Figure also includes correlation between identity variables (*ns*).

Appendix A

Scale items for the new Identity incompatibility scale

Assessed via 7-point likert scale (1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neither agree nor disagree, 5=somewhat agree, 6=agree, 7=strongly agree)

1. During my time at university, I have gone to certain lengths to manipulate the way I am perceived by others and therefore conceal part of my pre-university identity

2. I sometimes feel like an outsider at my university due to factors I cannot change, like where I came from or the kind of education my family have had.

3. I sometimes feel as though the identity I want to project at university is very different to the one I want to project back home.

4. I sometimes feel as though I have to switch between two different identities when I go from home to university, and vice versa.

5. I sometimes feel as though being at my university has caused me to develop values, beliefs and opinions that my family back home may not recognize or share.

6. I feel as though it is almost impossible to simultaneously fit in at my university while remaining the person I was before I came to university.

7. I often feel as though the people I interact with at university are not compatible with my family and friends back home.

8. When I return home, I am often reminded of how much I have changed since coming to university.