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Contents

Editor's Letter

This issue of the *Nordic Journal of Business* features two peer-reviewed articles related to business education. In the first article, Hannu Ojala and Päivi Kosonen examine how students' achievement goals and emotions influence their engagement with demanding coursework in business education. The second article by Mauri Laukkanen, Anmari Viljamaa, Sanna Joensuu-Salo and Elina Varamäki investigates students' entrepreneurship-related belief systems and how these beliefs relate to their entrepreneurial intentions.

I hope you enjoy reading the interesting articles included in this issue of the *Nordic Journal of Business*.

Sami Vähämaa
Editor
Nordic Journal of Business

How Achievement Emotions Relate to the Short-Term Stability of Goal-Orientation Profiles in an Introduction to Accounting Course

Hannu Ojala and Päivi Kosonen

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Abstract

Achievement emotions and achievement goal orientations jointly shape how students engage with demanding coursework. Nevertheless, very little is known about how these two constructs co-evolve within a single Introduction to Accounting course. Drawing on Control-Value Theory and Achievement Goal Theory and using latent profile analysis, we surveyed 98 first-year business students at the start and end of a six-week course. Latent-profile analysis revealed four re-

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curring goal-orientation configurations: Non-Competitive, Somewhat Competitive, Well-Adjusted, and Success-Seeking, which remained structurally stable throughout the term. Roughly two-thirds of students preserved their initial profile; the remainder moved in roughly equal numbers toward different configurations. Logistic-regression results showed that changes in enjoyment or boredom did not predict shifts. Increases in worry significantly triggered them. Increased worry nearly doubled the odds of shifting into a less adaptive profile, even after controlling for gender and high school GPA.

1. Introduction

We argue that students' achievement goals and emotions matter because they shape how students behave in class and how they judge their own progress. Understanding these patterns is crucial for teachers and programme directors, because a more supportive environment can help students both succeed academically and protect their well-being. In particular, emotions can be strongly associated with students' motivation (Putwain & Symes, 2012; Pekrun, 2019), yet only a few studies have asked whether specific achievement emotions, such as enjoyment, boredom and worry, drive changes in motivation over time in business education.

This question is especially pressing in an introductory accounting course, where large amounts of technical content are taught quickly (cf. Lucas, 2000), and success in the course partly determines access to later study options. Students who begin the module with mastery-oriented goals ("I want to understand") may drift toward performance-avoidance goals ("My aim is to avoid doing worse than other students") if negative emotions take hold. Conversely, timely enjoyment and a sense of control can keep students on a productive path (Pekrun, 2006).

The present study, therefore, follows 98 first-year accounting students over a six-week course to examine: (1) Which combinations of achievement goal profiles emerge at the start and end of the course. (2) How stable are these profiles, that is, do students remain in the goal profile until the end of the course? (3) Whether changes take place toward more or less adaptive profiles by the course end. (4) Which emotions, enjoyment, boredom or worry, best explain any shifts to another achievement goal profile? Thereby, this study follows the call by Huikku et al. (2022) to examine achievement goals using a longitudinal approach in the context of the Introduction to Accounting course. By linking goal profiles and achievement emotions within a single course, we aim to give educators concrete insight into when and why motivation changes.

The remainder of the paper is structured as follows. Section 2 discusses prior literature and develops the hypotheses. Section 3 describes the data and models. Section 4 presents the results of the primary analyses. Section 5 discusses our results and concludes the paper.

2. Literature review

2.1. The Stability of Achievement Goal Profile Structures

The Achievement Goal Theory (AGT) has gained significant attention within educational research since the mid-1980s, serving as a cornerstone for understanding students' motivation and behaviours related to achievement (Senko et al., 2011). The theory conceptualised students' motivations and behaviours in educational settings (Dweck, 1986; Nicholls, 1984). The

AGT highlights the significance of students' reasons for selecting courses, completing tasks, and persevering in their learning endeavours (Meece et al., 2006).

Initially, the AGT defined two goal dimensions within a dichotomous framework: mastery-approach goals and performance-approach goals (Dweck & Leggett, 1988). Mastery-approach goal-oriented students aspire to acquire an in-depth understanding and mastery of the task at hand. Their focus lies in developing and refining their skills and competence relative to the task (Harackiewicz et al., 1998). Prior research has consistently demonstrated that students adopting a mastery-approach goal exhibit strong motivation, characterised by a focus on work mastery, a preference for challenging tasks, and an intrinsic drive to meet their own, internally set standards of excellence (Elliot & McGregor, 2001).

Conversely, performance-approach goals typically entail a desire to outperform peers, often manifested in exam performance (Hulleman et al., 2010), with a strong emphasis on ego orientation, relative ability, and self-enhancement (Hulleman et al., 2010). Competitiveness is a major predictor of performance-approach goals (Harackiewicz et al., 1997; Elliot & McGregor, 2001). Subsequent developments have introduced performance-avoidance, where students strive to avoid appearing incompetent (Elliot & McGregor, 2001).

Among university students, research has shown that women are more inclined than men to adopt mastery goals, derive greater enjoyment from lectures, and engage more frequently in rehearsal-based study strategies (Harackiewicz et al., 1997, 2002). Using a single measurement and variable-based approach during an introduction to accounting course, Huikku et al. (2022) reported that male students had significantly higher scores in performance goal than female students, while the differences were insignificant in mastery and performance avoidance goals.

Recent research (cf. Niemivirta et al, 2019) has extended the AGT framework beyond single-dimensional constructs by examining goal orientation profiles, which consider the simultaneous adoption of multiple goals (e.g., mastery-approach, performance-approach and avoidance goals). Indeed, prior work has shown that students often endorse multiple achievement-related goals concurrently, with such multidimensional goal pursuit linked to a variety of academic outcomes (Tuominen-Soini et al., 2012). In this vein, the stability of these *profile structures* over time has become a relevant area of inquiry, particularly in structured academic contexts such as accounting education. Based on the above discussion, we set our first hypothesis.

H1. *The achievement goal profile structure identified at the beginning of the introductory accounting course remains stable by the end.*

2.2. The Stability of Students' Achievement Goal Orientations

Next, we focus on the stability of students' achievement goal orientations. Although the first and second research questions both concern stability, they capture related but not identical phenomena. In fact, under some circumstances, they are logically connected: if every student reports the same levels of mastery-approach, performance-approach, and performance-avoidance goals at both measurement points, then the overall latent *profile structure* must remain stable, and all students necessarily retain their initial profiles. However, profile structure stability does not automatically imply individual-level stability. The latent structure can remain unchanged even if some students' achievement goal orientations shift. For example, a trade-off could occur where the movements of certain students between profiles are offset by the opposite movements of others, resulting in a preserved structure at the group level. Thus, the first research question (and H1) concerns the invariance of the overall profile configuration. In contrast, the second research question addresses the likelihood of individual students maintaining their initial membership within that structure.

Regarding the stability of students' achievement goal orientations, prior literature has addressed students at various stages of education. Studies addressing the transition to upper secondary education also suggest that goal orientation profiles remain reasonably stable, even during educational transitions (Gonçalves et al., 2017; Tuominen-Soini et al., 2012). Miller (2015) demonstrated using a multi-institution sample of first year and senior students at colleges and universities across the United States that college students' goal orientations could predict their participation in high-impact educational practices (such as internships, study abroad, and capstone experiences), suggesting that these orientations are not fixed but malleable and play a meaningful role in shaping academic engagement and development.

Pulkka and Niemivirta (2013) investigated the stability and change in adult students' achievement goal orientations over a four-month period, as well as the relationship between these orientations and their perceptions of the learning environment within the Finnish National Defence University context. The study employed a person-centred longitudinal approach, allowing for the identification of distinct goal orientation profiles among students and tracking their evolution over the study period. The research found that while 60% of students maintained consistent achievement goal orientations, others did not. In their book chapter on a person-oriented approach to achievement goal orientations, Niemivirta et al. (2019, p. 19) conclude that students' achievement goal profiles do not fluctuate randomly but are relatively stable over time.

Senko and Harackiewicz (2005) identified two forms of achievement goal regulation across tasks, goal switching and goal intensification, and call for future research assessing individual variability in goal regulation. Goal switching involves shifting the dominant goal type, such as from a mastery goal to a performance goal, or between performance-approach and performance-avoidance orientations, depending on the task. For instance, a student may prioritise mastery in one activity but switch to a performance approach in another. Goal intensification refers to changes in the strength of goal endorsement without altering the type of goal. A student might, for example, strongly endorse mastery goals during a lab assignment but show weaker endorsement during an exam. These changes can be minor (indicating stability) or substantial (indicating instability).

Senko and Harackiewicz (2005, pp. 325–326) predicted strong goal stability alongside only modest goal regulation, reasoning that broader classroom dynamics—such as evaluation procedures and teaching styles—tend to remain relatively constant throughout the semester. Their empirical findings supported this expectation, providing evidence for the stability of students' goals across time. These findings would provide support for an idea of goal stability in a six-week Introduction to Accounting course, where classroom dynamics would be unlikely to change.

From a multiple-goals perspective (Barron & Harackiewicz, 2001; Pintrich, 2000), change can be viewed more broadly as adjustments within an individual's entire cluster of goals. Fryer and Elliot (2007) suggest that a college room goal change becomes particularly plausible when considering both the nature of goal adoption and the variety of ways an individual's goal commitments may shift. Goal adoption can be understood as a continuous variable rather than a discrete one, meaning achievement goal adoption is not an all-or-nothing process; individuals can endorse goals to varying extents.

The stability of achievement goals within an introduction to accounting course (in a business school context) has not been much researched. Therefore, following prior literature from other disciplines, we propose the following hypotheses:

H2: *Most students will retain their initial achievement-goal profile throughout the introduction to accounting course.*

2.3. The Directionality of Students' Achievement Goal Orientation Shifts

While H1 and H2 address the potential stability of achievement goal profiles, we will continue the inquiry by considering the directionality of change when it does occur. Prior research indicates that changes in goal orientation are not neutral or random. Instead, they may systematically reflect students' adaptation—or maladaptation—to the academic environment. Mastery-approach goals predict adaptive learning patterns (Pulkka and Niemivirta, 2013) like high engagement, enjoyment, and GPA. Performance-approach goals are ambivalent, offering achievement benefits but risking emotional stress. In contrast, performance-avoidance goals are considered maladaptive (Pulkka and Niemivirta, 2013), promoting anxiety, surface-level strategies, and underperformance.

Senko and Harackiewicz (2005) investigated how competence feedback influences goal stability among students enrolled in an introductory psychology course, both across a semester and in a laboratory experiment. Their results indicated that goals were generally stable over the semester and reflected the competence feedback students received. Notably, students seemed to shift between the two performance goals after receiving feedback from the initial set of exams, while their mastery goals were also regulated independently of feedback. In particular, declines in students' competence perceptions appeared to trigger corresponding shifts in their pursuit of goals.

Huikku et al. (2025) examined students' shifts between approaches to learning profiles in an Introduction to Accounting course. While students' approaches to learning differ from achievement goals, they share similar characteristics. Namely, intrinsic motivation underlies mastery goals and a deep approach to learning (Hulleman et al., 2010). Hulleman et al. (2010, p. 423), and numerous non-goal items employed to assess mastery goals closely resemble those used to measure interest and intrinsic motivation. Similarly, extrinsic motivation underlies performance goals and the surface learning approach. Mastery goals generally encourage using deep learning strategies, while performance goals are more likely to lead to surface-level approaches to learning (Senko et al., 2011).

Huikku et al. (2025) found that the majority of students initially exhibited a deep-dominated learning profile (83 students) compared to a smaller group with a surface-dominated profile (39 students). Over the duration of the course, however, more than one-third of the initially deep-dominated students (32 students) shifted to a surface-dominated profile. As a result, by the end of the course, the distribution had reversed, with more students classified as surface-dominated (64) than deep-dominated (58). Logistic regression analyses further indicated that this shift was predicted by a decline in mastery goals, an increase in performance goals, and students' perceptions of low teaching quality. Given the conceptual overlap between mastery goals and a deep approach to learning, as well as between performance goals and a surface approach, these findings may shed light on the potential development of mastery and performance goals throughout an introductory accounting program.

In demanding and assessment-intensive contexts such as introductory accounting courses, students may experience heightened performance pressure, leading them to shift from mastery-oriented profiles to those dominated by performance-approach or performance-avoidance goals. Senko & Harackiewicz (2005) suggest that shifts may occur between approach and avoidance goals, as well as between approach goals, specifically mastery and performance approach. Fryer and Elliot (2007) emphasise that changes in goal commitment are frequently tied to contextual challenges and perceived threats to competence, conditions commonly encountered in technical disciplines. An introductory accounting course might be a likely candidate for being perceived as a technical course. Lucas (2000, 497) examines introductory accounting students' views on accounting and suggests that "Students are primarily motivated to pass the examination. They express no doubts about what is required to achieve this, they must work through the learning materials and learn the techniques."

We argue that there are grounds to expect that students may shift to a less adaptive achievement goal profile towards the end of the course because their assessments are getting closer, and students may view the content of the introduction to accounting as a technical discipline dealing with numbers. Anxiety, a negatively affecting achievement emotion, is frequently reported among accounting students, often worsened by time-pressured exams, frequent testing, and a fear of making numerical errors (Lucas & Meyer, 2005). While moderate anxiety can sometimes enhance focus and preparation, persistent or intense anxiety generally undermines learning by diverting cognitive resources from task engagement (Pekrun, 2006). Female students in business disciplines, including accounting, often report higher anxiety levels and greater worry about failure, potentially due to stereotype threat and lower confidence in quantitative domains (Lucas & Meyer, 2005). If such emotions occur during the course, we expect that they trigger shifts towards less adaptive profiles.

Contrary to the hypothesis that students' achievement goals shift from adaptive to maladaptive during an introductory accounting course, Mladenovic (2000) provided evidence that course design can foster more constructive outcomes. In her study, the introductory accounting course incorporated aligned learning tasks, diverse teaching methods, and assessments that engaged with the political, social, and historical dimensions of accounting. By explicitly addressing and challenging students' initially negative perceptions, the course promoted the development of more realistic views of the discipline. Moreover, the active discussion of differences between teachers' and students' perceptions in lectures and tutorials further contributed to these adaptive changes.

Following the above discussion, we set the following hypotheses.

H3: *When a profile change occurs, students are more likely to transition to a less adaptive profile by the end of the course*

2.4. The Association between the Changes in Achievement Emotions and Short-Term Stability of Goal-Orientation Profiles

Building on the prior discussion of stability (H1–H2) and directionality (H3) of achievement goal profiles, this section explores the achievement emotions that may drive these shifts. According to Control-Value Theory of Achievement Emotions by Pekrun (2006), emotions such as enjoyment, anxiety, and boredom arise from students' appraisals of control (over learning tasks) and value (assigned to those tasks). These emotions are not just by-products of achievement processes. Instead, they actively shape cognitive, motivational, and behavioural outcomes, including goal adoption and persistence (Pekrun et al., 2002).

Goetz et al. (2006, 25) recommend that students' emotions should be investigated using domain-specific approaches. Emotions may be essential in academically demanding and quantitatively intensive fields like accounting. Studies have shown that enjoyment and interest are closely linked to mastery-oriented goals, promoting deep learning and adaptive engagement (Pekrun et al., 2009). In contrast, worry (Elliot & McGregor, 2001), as well as anxiety and boredom, are more frequently associated with performance-avoidance goals, which undermine intrinsic motivation and academic resilience (Möcklinghoff et al., 2023).

We expect that this emotional–motivational interplay is especially critical in introductory accounting courses, where students may experience both a heightened desire to succeed and a fear of failure. For example, female students may face stereotype threats that add to their worries and foster performance-avoidance goals (Brodish & Devine, 2009). At the same time, high-achieving students who enjoy mastering mathematical concepts may increasingly align with mastery-based profiles (Li et al., 2021). Emotional responses can thus either reinforce stable motivational patterns or serve as triggers for profile transitions, pushing students toward either more or less adaptive configurations depending on their affective experiences.

This line of inquiry highlights the bidirectional relationship between emotional dynamics and achievement goal orientations. While emotions can result from motivational orientations, they also have the power to shape students' motivational patterns across time, particularly within cognitively and emotionally burdensome domains like accounting.

Based on the above discussion, we propose the following hypotheses:

H4a: *Increases in students' enjoyment across the semester will predict movement into more adaptive achievement-goal profiles.*

H4b: *Increases in students' worry or boredom across the semester will predict movement into less adaptive achievement-goal profiles.*

3 Methods

3.1. Participants and procedure

Data for this study were collected from a mandatory introduction to accounting course in a Nordic country in 2017. The course can be considered a high-stakes first-year course within the bachelor's degree program, because its final grade is important in determining eligibility for admission into various majors selected at the end of the first academic year. Additionally, performance in this course directly contributes to students' qualifications for international study exchange programs.

Two researchers administered the survey during the course's initial lecture. University entrance data were used to obtain information regarding students' high school grade points, while data on students' exam performance served as indicators of their in-course performance.

Initially, the sample comprised 321 participants, representing all students registered for the course, of which 38% were female. However, after filtering out individuals who did not complete the survey questionnaire or were not enrolled in the business school, the final number of observations for the current study stood at 154 at the beginning of the course. Because we need survey questionnaire data at the beginning and the end of the course, the usable information drops to 98 students. The study office administered the exam following the completion of the lectures. It comprised questions on bookkeeping, financial statement ratios, and short essay responses. The overall course evaluation (maximum of 106 points) was based on the final exam (up to 60 points), two open-book midterm exams (up to 20 points), and teamwork contributions (up to 26 points).

Ethical approval was obtained from the business school to investigate the association between students' achievement goals, study success, student characteristics, and learning environment. Additionally, permission was individually sought from each participating student via the cover page of the research questionnaires. Emphasis was placed on the voluntary nature of participation, and students who opted to participate had the opportunity to complete the questionnaire at the start of the lecture, with the lecture paused for this purpose. This approach ensured that participating students did not need to sacrifice their free time outside class and did not miss any lecture content. Furthermore, participants were assured that their responses would remain confidential, and measures were taken to protect their anonymity.

3.2. Research instruments

Achievement goals were measured using the revised Achievement Goal Questionnaire (AGQ-revised) by Elliot and Murayama (2008), which was incorporated into the survey questionnaire. Additionally, we used measurement instruments by Duff and Mladenovic (2015) to capture the emotions of students using the following measurement items: "I expect that I will enjoy accounting studies" (enjoyment), "I do not have a personal interest in accounting, and I expect it to be boring." (boredom) and "I am worried about my learning in accounting." (worry). Variable definitions are presented in Table 1.

Table 1. Variable definitions.

VARIABLE	DESCRIPTION
Performance-Approach Goal	The mean of the raw scores was constructed from the 'Achievement Goal Questionnaire revised' (AGQ-revised) by Elliot and Murayama (2008).
Mastery-Approach Goal	The mean of the raw scores was constructed from the 'Achievement Goal Questionnaire revised' (AGQ-revised) by Elliot and Murayama (2008).
Performance-Avoidance Goal	The mean of the raw scores was constructed from the 'Achievement Goal Questionnaire revised' (AGQ-revised) by Elliot and Murayama (2008).
Changes in Enjoyment	Change in a five-point Likert scale measurement item, "I expect that I will enjoy accounting studies" from inventory by Duff and Mladenovic (2015) during the introduction to accounting course.
Changes in Boredom	Change in a five-point Likert scale measurement item, "I do not have a personal interest in accounting, and I expect it to be boring." from inventory by Duff and Mladenovic (2015) during the introduction to accounting course.
Changes in Worry	Change in a five-point Likert scale measurement item, "The student feels anxious about learning accounting" from inventory by Duff and Mladenovic (2015) during the introduction to accounting course.
Female	Equals to 1 if the student is female and zero if the student is male.
HSGPA	High school grade point average of matriculation examination.

3.3. Analysis strategy

Data analysis proceeded in four steps closely aligned with the hypotheses H1-H4. First, we verified the factor structures and factor reliabilities of mastery, performance, and performance-avoidance orientation items. Then, we constructed mean variables. Table 2 shows the measurement items underlying the empirical analysis's mean variables. Each mean variable consists of two to four measurement items, with a Likert scale ranging from 1 to 5. Therefore, the theoretical scales of the mean of variables range from 1 to 5.

Furthermore, our analysis reveals that all subscale scores exhibit adequate internal consistency. The Cronbach's alpha values for the Performance, Mastery, and Performance-avoidance goals are 0.947, 0.764, and 0.863, respectively. Following Nunnally's (1978) guidelines, Cronbach's alpha values between 0.7 and 0.8 are deemed satisfactory, those between 0.8 and 0.9 are considered good, and values above 0.9 are classified as excellent. Thus, Cronbach's alpha values in our analysis range from satisfactory (Mastery goal), good (Performance-avoidance goal) to excellent (Performance goal).

Table 2. Construct Assessment Regarding Achievement Goals (n = 98)

CONSTRUCT	INDICATOR	LOADING	DECISION	CRONBACH'S A
Performance-approach goal				0.947
	I am striving to do well compared to other students.	0.911	Retained	
	My aim is to perform well relative to other students.	0.922	Retained	
	My goal is to perform better than the other students.	0.945	Retained	
Mastery-approach goal				0.764
	My aim is to completely master the material presented in this class.	0.655	Retained	
	My goal is to learn as much as possible.	0.621	Retained	
	I am striving to understand the content of this course as thoroughly as possible.	0.924	Retained	
Performance avoidance goal				0.863
	I am striving to avoid performing worse than others.	0.714	Retained	
	I am striving to avoid an incomplete understanding of the course material.	0.971	Retained	
	My aim is to avoid doing worse than other students.	0.801	Retained	

Notes. Latent confirmatory factor analysis construct represented by the performance-approach, mastery-approach, and performance-avoidance goal items are based on responses to the inventory AGQ-revised (Elliot & Murayama, 2008).

The above three scales (performance-approach, mastery-approach and performance-avoidance goals) were used as inputs when we performed a latent profile analysis (LPA) to identify subgroups of students with distinct achievement goal orientations. LPA is a statistical technique rooted in latent class modelling, a subset of structural equation modelling (Vermunt & Magidson, 2005). It assumes unobservable or latent subgroups that can be inferred from observed variables. In the context of this study, LPA could uncover latent profiles of students based on their questionnaire responses about their achievement goals. By assigning students to distinct profiles, LPA allowed us to explore how different subgroups may exhibit unique patterns (Lubke & Muthén, 2007) of achievement goals.

In LPA, the researcher does not decide the number of LPA classes; instead, a statistical criteria for determining the appropriate number of classes of LPA is used (cf. Nylund et al., 2007). Bayesian Information Criteria (BIC) is the tool for LPA model selection (Schwarz, 1978). Figure 1 illustrates the latent profiles at the beginning and end of the course.

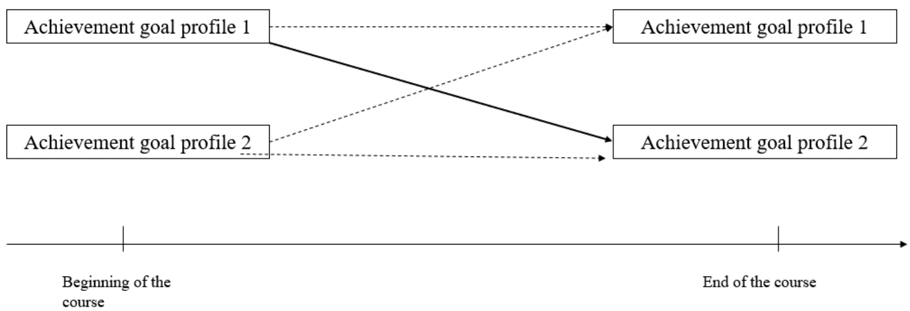

Figure 1. Goal profiles at the beginning and the end of the course

Following H1, we will compare how the achievement goal profile structure emerges at the beginning and the end of the course. The comparison includes the number of profiles and the mean scores of input scales (performance-approach, mastery-approach and performance-avoidance goals) in each profile. Given the absence of prior research examining the stability of achievement goal profiles specifically within a business school course context, there is no established basis for predicting the number or nature of profiles that may emerge at the beginning and end of the course. As such, this remains an empirical question to be addressed by the present study.

As the second step, we examine Hypothesis 2 (H2), which investigates whether students remain in the same achievement goal profile throughout the course or transition to a different one. Specifically, we assess the stability of these profiles from the beginning to the end of the course (represented by horisontal arrows in Figure 2), as well as directional shifts, either towards a more adaptive profile (upward diagonal arrow) or towards a less adaptive profile (downward diagonal arrow). The profiles are organised along a continuum based on their adaptiveness. The least adaptive profile (Profile 1) is characterised by high performance-avoidance and low mastery-approach orientation, while the most adaptive profile exhibits low performance-avoidance and high mastery-approach goal orientations.

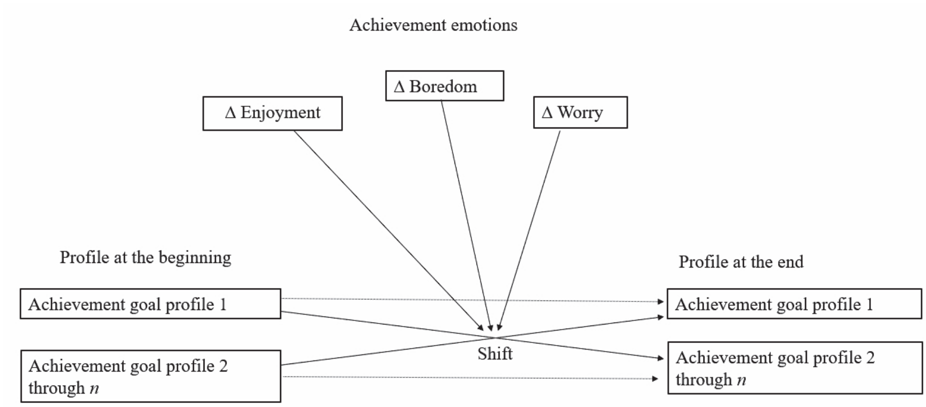

Figure 2. The theoretical model

In the third step, we test Hypothesis 3 (H3), which posits that when students' achievement goal profiles change during the course, these transitions are more likely to be toward less adaptive profiles. To evaluate this, we focus on the diagonal transitions illustrated in Figure 2, representing shifts between different profiles from the beginning to the end of the course. Transitions downward along this continuum (diagonal arrows pointing to lower-ranked profiles) are interpreted as maladaptive shifts, whereas upward transitions indicate movement toward more adaptive motivational orientations. H3 is supported if the frequency or likelihood of shifts to less adaptive profiles exceeds that of shifts to more adaptive profiles, revealing a trend of motivational decline. We use the Binomial Test to compare such shifts.

Fourth, the upper part of Figure 2 illustrates how we provide evidence to H4 using logistic regression to explain potential shifts from one profile to another using changes in achievement emotions as predictors. *Changes in enjoyment, boredom*, and *worry* are measured as follows (see Table 1: Variable definitions). For example, *Change in enjoyment* is calculated from a five-point Likert scale measurement item, "I expect that I will enjoy accounting studies," from an inventory by Duff and Mladenovic (2015) collected using a survey questionnaire at the beginning and end of the course. The change is the end value minus the initial value. The change in boredom and worry was calculated identically. The logistic regression is described in Equation (1).

$$\mathrm{ProfileShift} = \alpha_0 + \alpha_1\mathrm{Incr.inEnjoyment} + \alpha_2\mathrm{Incr.inBoredom} + \alpha_3\mathrm{Incr.inWorry} + \Sigma_1\mathrm{Controls} + e$$

Potential influences of gender and prior academic ability were controlled by including the following two variables: *Female* and high school grade point average *(HSGPA)*. The female variable was coded as '1' if a student was female and '0' otherwise. Huikku et al. (2022) found that male students were more likely to adopt performance-approach goals in an introduction to accounting course than female students. Furthermore, female students reportedly adopt mastery approach goals (Bouffard et al., 1995; D'Lima et al., 2014). Regarding the association between achievement goals and SALs, Palos (2020) found that female students with a mastery-approach goal approach were highly likely to adopt a deep approach to learning.

Students' ability may affect their achievement profile. In the context of Norwegian psychology education, Diseth (2007) showed that high school grade point average (HSGPA) had a direct effect on examination grades and an indirect effect via self-efficacy and performance approach. Therefore, we measured prior academic ability using the HSGPA (cf. Diseth, 2007; Huikku et al., 2022; Huikku et al., 2025), provided by the university where the students in the current study were enrolled. As an HSGPA measure, we use students' matriculation examination points similarly to Huikku et al. (2022) and Huikku et al. (2025).

4. Results

4.1. Achievement orientations at the beginning and the end of the course

Figure 3 summarises log-likelihood values, degrees of freedom, and the BIC for four models with an increasing number of achievement goal classes (from one class to five). Here, the BIC, a measure of model fit that balances goodness of fit with model complexity, was calculated for each model. Lower BIC values indicate a better trade-off between fit and complexity. In BIC values, researchers seek the lowest values that identify the optimal number of classes (cf. Schwarz, 1978; Burnham & Anderson, 2004). A four-class solution emerged as the best fit for the data, as evidenced by the lowest Akaike Information Criteria (AIC) and BIC values for this solution.

As a robustness check, we also examined whether the latent profile structure would have differed had we based the analysis on all 154 students who completed the baseline survey, rather than restricting it to the 98 students who participated at both measurement points. The results indicated that the same four-profile solution emerged, and the overall structure remained unchanged. This suggests that attrition did not affect the identification of latent profiles.

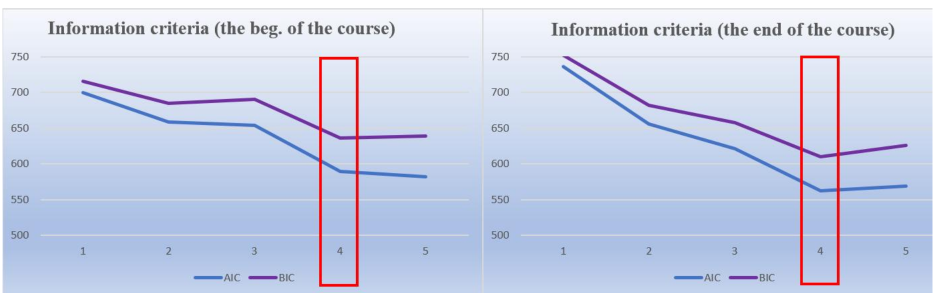

Figure 3. Akaike and Bayesian Information Criteria (n = 98)

In Profile 1, students report low performance-approach orientation and high performance-avoidance, suggesting a disengagement from competitive academic striving. The highest performance-avoidance score refers to a maladaptive pattern of motivation (cf. Tuominen-Soini et al. 2012). Accordingly, we label this the Non-competitive profile. Profile 2 shows a moderate increase in performance-approach orientation and a reduction in performance-avoidance. Therefore, we label it Somewhat competitive profile. Profile 3 continues this pattern, with further increases in performance-approach orientation and continued decreases in performance-avoidance, while mastery remains fairly stable. We label this configuration as the Well-adjusted profile. Finally, Profile 4 is characterised by high levels of both performance- and mastery-approach orientations, and low performance-avoidance, reflecting a highly motivated and positively engaged group. We label this the Success-seeking profile.

Overall, the profiles maintain a consistent structure across time, with four distinct groups present at both the beginning and end of the course. Moreover, the mean scores for the three goal orientations (performance-approach, mastery-approach, and performance-avoidance) display comparable developmental trends across the profiles at both time points. From Profile 1 to Profile 4, performance-avoidance decreases, performance orientation increases clearly, and mastery-approach orientation increases moderately. These consistent structural patterns provide empirical support for Hypothesis 1 (H1), as we posited that the latent achievement goal profile structure identified at the beginning of the introductory accounting course would remain stable by the end.

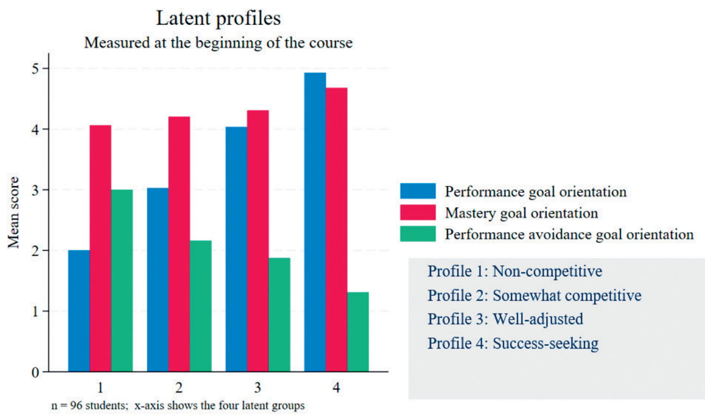

Figure 4a. Latent Profiles at the Beginning of the Course

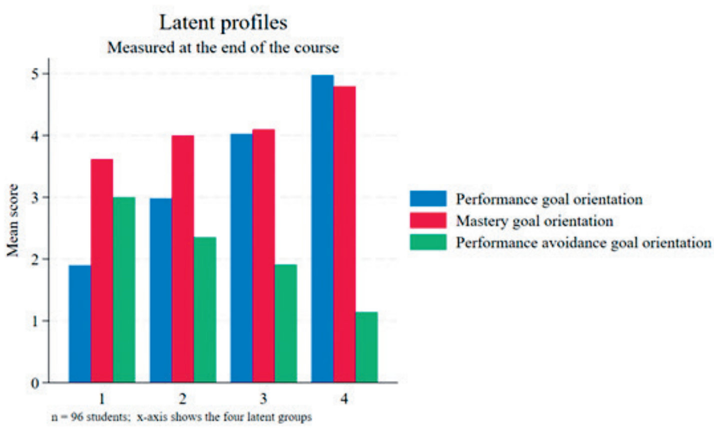

Figure 4b. Latent Profiles at the End of the Course (n = 98)

Next, Table 3 provides descriptive statistics for the entire sample in Panel A and separately for each profile (at the beginning and end of the course) in Panel B. The scores for performance-approach goals at the beginning (mean = 3.828) and end (mean = 3.795) of the course are relatively high and stable, indicating a consistent focus on outperforming others. Mastery-approach scores at the beginning (mean is 4.360) are the highest among the achievement goal variables, suggesting a strong emphasis on learning and skill mastery. However, a slight reduction in scores is observed at the end of the course. There is a clear increase in worry (mean increase of 0.490) from the beginning to the end of the course, which aligns with the proximity of the final exam, indicating heightened stress levels. Enjoyment scores show a slight decline (mean decrease is -0.102), while boredom remains largely stable with minimal increases (mean increase is 0.020). Female representation is 34.3%, and the mean high school GPA (HSGPA) is 28.9. The mean values of HSGPA are similar to those reported earlier. Huikku et al. (2025) reported a mean HSGPA value of 26.3, and Huikku et al. (2022) reported the mean HSGPA (titled as Prior Knowledge) separately for female (mean 29.7) and male students (mean 26.4). Overall, students experience moderate increases in worry, but their levels of enjoyment and boredom remain stable throughout the course.

Table 3 Panel A. Descriptive statistics for the sample (n = 98)

	MEAN	MEDIAN	STANDARD DEVIATION
Performance, beg.	3.828	4.000	0.958
Performance, end	3.795	4.000	1.014
Mastery, beg.	4.360	4.333	0.538
Mastery, end	4.199	4.333	0.646
Perf. Avoid, beg.	1.906	2.000	0.902
Perf. Avoid. End	1.936	2.000	0.839
Enjoyment, beg.	3.939	4.000	0.793
Enjoyment, end	3.847	4.000	0.878
Incr. in enjoyment	-.102	0.000	0.753
Boredom, beg.	1.707	2.000	0.811
Boredom, end	1.724	1.000	0.939
Incr. in boredom	0.020	0.000	0.773
Worry, beg.	1.586	2.000	0.639
Worry, end	2.071	2.000	0.987
Incr. in worry	0.490	0.000	0.900
Female	0.343	0.000	0.477
HSGPA	28.939	32.00	8.419

Panel B divides the sample into the four latent profiles, Non-competitive, Somewhat Competitive, Well-adjusted and Success-seeking, showing mean scores at the beginning and end of the course. Success-seeking students display the strongest performance-approach orientation throughout the course (mean score at the beginning is 4.93, and 4.97 at the end). At the other extreme, Non-competitive students remain well below the scale mid-point (mean score at the beginning is 2.00, and at the end 1.90), confirming their low concern for outperforming peers. All groups value understanding, as can be seen from their high mastery goal score, but Success-seekers again have the highest scores (at the beginning 4.68, and at the end 4.80). Mastery decreases during the course for Non-competitive students (at the beginning 4.06, at the end 3.62) and holds at a moderate level for the two middle profiles. Non-competitive students consistently show the highest performance-avoidance scores (beginning 3.00, end 3.00), whereas Success-seekers remain the least worried about looking incompetent (beginning 1.31, end 1.14).

Enjoyment scores are highest among Success-seekers and stay almost unchanged (beginning 4.32, end 4.31). In contrast, Non-competitive students report a sharp drop (beginning 3.82, end 3.00). Boredom rises most for the Non-competitive group (beginning 1.73, end 2.15) but falls slightly for Success-seekers (beginning 1.50, end 1.35) and for Somewhat Competitive students (beginning 1.91, end 1.83). Worry increases across all profiles, yet its level and growth are clearest in the Non-competitive profile (beginning 1.91, end 2.46, change +0.55) and Well-adjusted groups (beginning 1.60, end 2.20, change +0.60). Success-seekers begin with the lowest worry (1.29) and maintain that low worry despite its modest rise to 1.73.

Female students cluster in the less competitive profiles: 64 % of Non-competitive and 52 % of Somewhat Competitive members are women, compared with only 14 % in the Success-seeking profile. These shares change little by the end of the course. High-school GPA is highest for Non-competitive students (mean score 32.6) and lowest for the Well-adjusted group (mean score 27.8), suggesting that stronger prior grades do not automatically translate into a competitive goal set.

Table 3 Panel B. Descriptives by Profiles (n = 98)

VARIABLES / PROFILES	NON-COMPETITIVE	SOMEWHAT COMPETITIVE	WELL-ADJUSTED	SUCCESS SEEKING
Performance, beg.	2.000	3.029	4.036	4.929
Performance, end	1.897	2.982	4.024	4.974
Mastery, beg.	4.061	4.203	4.306	4.679
Mastery, end	3.615	4.000	4.098	4.795
Perf. Avoid, beg.	3.000	2.159	1.874	1.310
Perf. Avoid. end	3.000	2.351	1.911	1.141
Enjoyment, beg.	3.818	3.609	3.892	4.321
Enjoyment, end	3.000	3.722	3.878	4.308
Incr. in enjoyment	-0.818	0.113	-0.014	-0.013
Boredom, beg.	1.727	1.913	1.730	1.500
Boredom, end	2.154	1.833	1.780	1.346
Incr. in boredom	0.427	-0.080	0.050	-0.154
Worry, beg.	1.909	1.783	1.595	1.286
Worry, end	2.462	2.000	2.195	1.731
Incr. in worry	0.553	0.217	0.600	0.445
Female, beg,	0.636	0.522	0.297	0.143
Female, end	0.615	0.579	0.244	0.192
HSGPA, beg.	32.636	29.348	27.811	28.643
HSGPA, end	32.923	26.000	30.073	27.308

4.2. Students' shifts from one profile to another

Table 4 in the manuscript analyses students' movement between achievement goal orientation profiles during the course. Table 4 shows that the Well-Adjusted Profile and the Success-Seeking Profile exhibit the highest stability rates. Students in these profiles are less likely to shift to another profile compared to those in less competitive profiles, indicating a strong alignment between their initial goals and evolution throughout the course. The Non-Competitive Profile shows the lowest stability, with a significant proportion of students transitioning to other profiles. This suggests that students in this group may face external or internal pressures, prompting them to reevaluate their goals.

Table 4. Shifts from one profile to another (n = 98)
Panel A. Students' profiles at the beginning and the end

	END				
BEGINNING	NON-COMPETITIVE	SOMEWHAT COMPETITIVE	WELL ADJUSTED	SUCCESS-SEEKING	TOTAL
Non-competitive	7	3	1	0	11
Somewhat competitive	5	11	6	1	23
Well adjusted	1	4	28	3	36
Success-seeking	0	0	6	22	28
Total	13	18	41	26	98

Chi-squared p-value is 0.758

Panel B. Shifts from one profile to another

Profile	Beginning	Shift up	Shift down	No shift	End
Non-competitive	11.1 %	4.0 %	0.0 %	7.1 %	11.2 %
Somewhat competitive	23.2 %	7.1 %	5.1 %	11.1 %	23.5 %
Well adjusted	37.4 %	3.0 %	6.1 %	28.3 %	36.7 %
Success-seeking	28.3 %	0.0 %	6.1 %	22.2 %	28.6 %
	100.0 %	14.1 %	17.2 %	68.7 %	100.0 %

Binomial Test Statistic (Downward Shifts): 17 (out of 31 total directional shifts), p-value is 0.360

A smaller percentage of students' transition from less competitive profiles (e.g., Non-Competitive or Somewhat Competitive) to more competitive profiles (e.g., Success-Seeking). This reflects the challenges in adopting more competitive goal orientations, possibly due to emotional or contextual barriers. The downward shifts are clearer, particularly from the Success-Seeking Profile to less competitive profiles. Table 4 shows that the first (non-competitive) profile initially has the fewest students and even fewer at the end. To summarise, students do not shift much in either direction (14% to a more competitive profile or 17% to a less competitive profile). The Chi-squared test (p-value is 0.758) indicates that statistically, the distributions of students in the profiles are not different between the beginning and the end. The binomial test yields a p-value of 0.36, indicating that there is no statistically significant evidence to support the hypothesis that downward shifts occur more frequently than upward shifts. In other words, based on this data, we cannot reject the null hypothesis that upward and downward shifts are equally likely. Therefore, H3 is not supported.

4.3. Achievement emotions as predictors of the shifts

Figure 5 illustrates that achievement emotions such as enjoyment, boredom, and anxiety remain relatively stable throughout the course. These findings suggest that students' emotional experiences during the accounting course are not significantly influenced by the progression of the course or shifts in their achievement goal orientations. However, an exception to this general trend is the increase in worry or anxiety towards the end of the course. The heightened worry observed in the later stages of the course may be attributed to the proximity of the final exam.

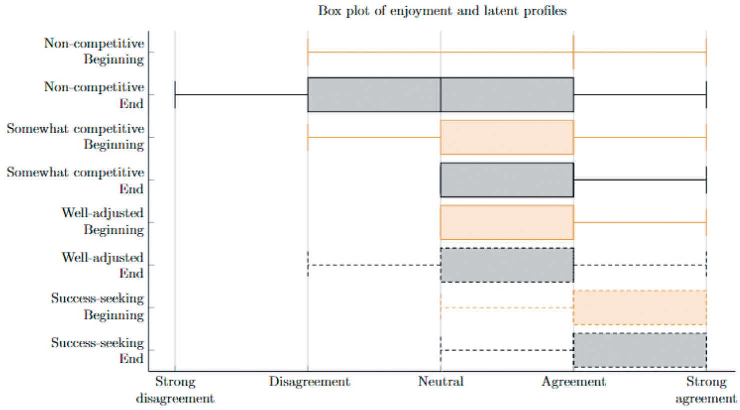

Figure 1: Figure 5a. Box plot of enjoyment and latent profiles (n = 98)

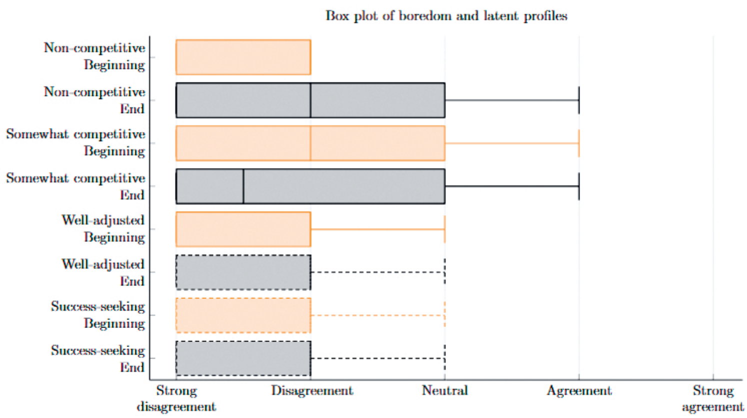

Figure 2: Figure 5b. Box plot of boredom and latent profiles (n = 98)

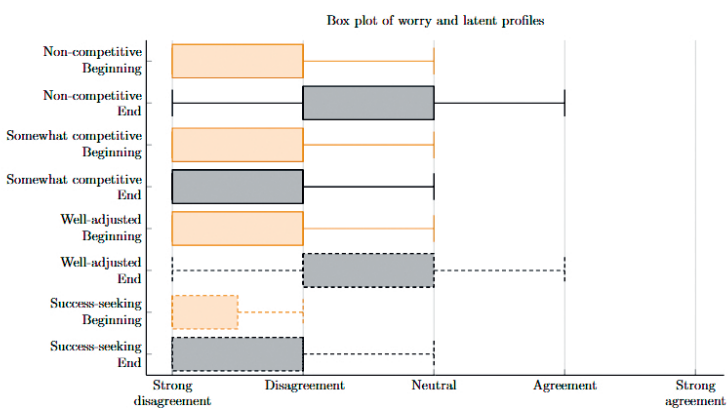

Figure 3: Figure 5c. Box plot of worry and latent profiles (n = 98)

The findings in Figure 5c are consistent with the literature on achievement goals, demonstrating a strong association between increased worry and performance-avoidance goals. Performance-avoidance goals are closely linked with worry across various dimensions of test anxiety (Möcklinghoff et al., 2023), and performance–avoidance goals and worry mediate the effect of stereotype threat on performance (Brodish & Devine, 2009). A direct correlation between performance-avoidance goals and worry has also been observed in academic testing contexts (Stan & Oprea, 2015), and they mediate the relationship between competence beliefs and anxiety (Putwain & Symes, 2012). In line with this, the current study's descriptive statistics show that the Non-Competitive profile, characterised by heightened performance-avoidance, is prone to increases in students' worry.

Table 5 examines the impact of changes in achievement emotions (enjoyment, boredom, and worry), along with gender and high school GPA (HSGPA), on shifts between achievement goal profiles. The analysis distinguishes between shifts to a more competitive profile (Panel A) and a less competitive profile (Panel B). Panel A explores the predictors of students transitioning from less competitive profiles (e.g., Non-Competitive or Somewhat Competitive) to more competitive profiles (e.g., Well-Adjusted or Success-Seeking). Increased enjoyment does not significantly influence upward shifts (coefficient = 0.971, p-value = 0.949), suggesting that a rise in enjoyment alone may not motivate students to adopt a more competitive orientation. The same applies to other changes in achievement motivations. The change in boredom (coefficient is 1.405, p-value is 0.441), worry (coefficient is 1.009, p-value is 0.978), and control variables are insignificant. The predictors do not explain shifts to more competitive profiles well, as indicated by the low pseudo R^2 value (0.017). This suggests that upward shifts may depend on other unmeasured factors, such as intrinsic motivation, course content, or external influences.

Panel B of Table 5 analyses the predictors of transitions from adaptive profiles (e.g., Success-Seeking or Well-Adjusted) to less adaptive ones (e.g., Non-Competitive or Somewhat Competitive). Changes in Enjoyment (coefficient is 0.603, p-value is 0.256) and Boredom (coefficient is 2.073, p-value is 0.108) are insignificant. Increased worry strongly predicts downward shifts, with a coefficient of 1.975 and a p-value of 0.032. This aligns with findings from earlier parts of the empirical analysis, emphasising that heightened worry triggers students' shifts towards less adaptive goal orientations. Control variables are insignificant.

Table 5. The effect of achievement emotions on a shift to another profile (n = 98)

Panel A The effect of achievement emotions on a more competitive profile

SHIFT TO A MORE COMPETITIVE PROFILE	COEF.	ST.ERR.	*t*-VALUE	*p*-VALUE	[95% CONF	INTERVAL]	SIG
Incr. in enjoyment	0.971	0.441	-0.06	0.949	.399	2.367	
Incr. in boredom	1.405	0.620	0.77	0.441	.592	3.334	
Incr. in worry	1.009	0.338	0.03	0.978	.523	1.947	
Female	1.357	0.842	0.49	0.623	.402	4.581	
HSGPA	0.987	0.034	-0.38	0.705	.922	1.057	
Constant	0.208	0.213	-1.53	0.126	.028	1.556	

Mean dependent var	0.143	SD dependent var	0.352
Pseudo r-squared	0.017	Number of obs	98
Chi-square	1.380	Prob > chi2	0.927
Akaike crit. (AIC)	91.003	Bayesian crit. (BIC)	106.513

*** p<.01, ** p<.05, * p<.1

Panel B The effect of achievement emotions on a less competitive profile

SHIFT TO A LESS COMPETITIVE PROFILE	COEF.	ST.ERR.	*t*-VALUE	*p*-VALUE	[95% CONF	INTERVAL]	SIG
Incr. in enjoyment	0.603	0.268	-1.14	0.256	0.252	1.442	
Incr. in boredom	2.073	0.940	1.61	0.108	0.853	5.041	
Incr. in worry	1.975	0.628	2.14	0.032	1.059	3.684	**
Female	0.723	0.467	-0.50	0.615	0.204	2.564	
HSGPA	0.970	0.033	-0.89	0.376	0.907	1.037	
Constant	0.262	0.254	-1.38	0.167	0.039	1.752	

Mean dependent var	0.163	SD dependent var	0.372
Pseudo r-squared	0.134	Number of obs	98
Chi-square	11.712	Prob > chi2	0.039
Akaike crit. (AIC)	87.517	Bayesian crit. (BIC)	103.027

*** p<.01, ** p<.05, * p<.1

5. Discussion and Conclusions

5.1. Discussion

This study examined the short-term stability and transformation of achievement goal orientations, as well as their relationship with achievement emotions, in the context of an introductory accounting course. The results offer nuanced support for most of the proposed hypotheses.

First, the achievement goal profiles exhibited a stable four-profile structure throughout the course, with consistent trends in goal orientations: performance-avoidance decreased, performance-approach orientation increased, and mastery-approach orientation rose moderately from Profile 1 to Profile 4. This pattern supports Hypothesis 1, confirming the stability of the latent profile structure over time.

Second, we found moderate stability in students' achievement goal profiles over the six-week course. Approximately two-thirds of students retained their initial profiles, with the latent profile structure remaining largely consistent throughout. These findings partially support H2, suggesting that a meaningful proportion (about 31%) of students experienced profile transitions. This aligns with prior research that acknowledges stability and change in achievement goals over time (e.g., Niemivirta et al., 2019; Pulkka & Niemivirta, 2013).

Third, the hypothesis that students who shifted profiles would be more likely to move toward less adaptive (less competitive) profiles (H3) was not supported. Although descriptively there were more downward shifts (17.2%) than upward ones (14.1%), the binomial test indicated that this difference was not statistically significant (p = 0.36). Likewise, a chi-squared test of the distribution of students across profiles from beginning to end did not show a significant change (p = 0.758). These findings suggest that while motivational instability exists, it is not systematically skewed toward negative adaptation at a student level.

Fourth, hypothesis H4a was not supported. Neither enjoyment nor boredom significantly predicted transitions into more adaptive profiles, as indicated by logistic regression results (p-values > .25). These findings suggest that positive or neutral emotional changes alone may not be sufficient to initiate shifts in students' goal orientations during a short-term academic intervention. However, hypothesis H4b was partially supported. Among students who shifted profiles, increased worry significantly predicted transitions into less adaptive profiles (p = 0.032). This finding supports the theoretical framework of Control-Value Theory (Pekrun, 2006), which posits that anxiety stemming from low perceived control and high task value can undermine adaptive motivation. It is also consistent with prior research linking worry to performance-avoidance goals (e.g., Möcklinghoff et al., 2023; Putwain & Symes, 2012).

Gender differences in goal orientation profiles were observed descriptively. Female students were more likely to be found in less competitive profiles, while male students dominated the Success-Seeking group. However, in logistic regression analyses, gender did not significantly predict profile transitions. This suggests that while gender may influence the initial adoption of motivational profiles, it does not appear to drive changes in those profiles over time. Similarly, high school GPA, though included as a control, did not significantly explain profile movement, indicating that academic background may shape entry-level motivations more than their evolution.

These findings contribute several insights to the literature. First, they demonstrate that even in high-pressure and quantitatively demanding environments, such as accounting education, motivational profiles can remain relatively stable. Second, the study underscores the destabilising role of worry, suggesting that emotional regulation interventions may be more effective than efforts targeting engagement or enjoyment alone. Third, it nuances the gender literature by distinguishing between static motivational differences and dynamic motivational shifts.

5.2. Conclusions

This study demonstrated that achievement goal profiles in an introductory accounting course remained structurally stable, while roughly one-third of students shifted profiles. Worry emerged as the most consistent emotional predictor of downward shifts. These results highlight the importance of monitoring students' affective experiences in demanding courses.

Overall, this research extends Achievement Goal Theory by demonstrating its applicability in a short, high-stakes business education context. It provides new evidence that achievement emotions, especially worry, can serve as a critical driver in shaping or destabilising students' motivational orientations. These findings have practical implications for instructors and program designers seeking to create more emotionally supportive learning environments in accounting and related disciplines.

5.3. Limitations, future directions, and practical implications

While this study offers novel insights into the interplay between achievement emotions and goal profile stability in accounting education, several limitations should be acknowledged.

First, the sample size (n = 98) and single-institution setting limit the generalizability of the findings. Replicating the study with larger and more diverse cohorts—across disciplines, cultural contexts, and academic levels—would enhance external validity. Second, the short time frame (six weeks) restricts our ability to capture longer-term motivational development. Future research should adopt longitudinal designs spanning multiple semesters or academic years to explore whether the observed emotional effects persist or intensify over time.

Second, although this study was conducted in an Introduction to Accounting course within a business school, the course was open to students across different intended majors. Motivational tendencies, such as competitiveness, may differ by field (e.g., finance versus human resource management). Unfortunately, we did not have access to data on students' selected majors at the time of the course, which limits our ability to examine whether achievement goal orientations and emotional dynamics varied across disciplinary trajectories. Future research should therefore investigate how students' chosen majors shape their achievement goal profiles and emotional experiences in introductory courses.

Third, it would be valuable to replicate this study at the Master's level, where disciplinary specialisation is clearer and students may face different motivational and emotional pressures than in first-year studies. Comparative analyses across majors (e.g., accounting, finance, management, and human resources) and across academic levels (Bachelor's versus Master's) would provide deeper insight into how achievement goals and emotions interact in diverse educational contexts.

Fourth, although we focused on three central emotions, enjoyment, boredom, and worry, other achievement emotions (e.g., pride, shame, hopelessness) may also influence students' motivational pathways. Expanding the emotional framework could provide a more comprehensive understanding of the affective mechanisms driving shifts in goal orientation.

Fifth, while we included gender and high school GPA as control variables, other individual difference factors, such as self-efficacy, resilience, or personality traits, may moderate the relationship between emotions and goal profiles. Exploring such moderators could clarify why some students remain stable while others change.

From a practical standpoint, our findings underscore the importance of supporting students' emotional well-being in business education. The strong link between worry and shifts toward less adaptive goal profiles highlights the need for psychologically safe learning environments, particularly in demanding introductory accounting courses. This concern is timely given recent evidence of declining mental health among business students; for example, a 2023 survey by Suomen Ekonomit reported that 36% of Finnish business students are dissatisfied with their mental well-being.

Instructors can respond in several ways. One possibility is to try to reduce students' worry by paying attention to students' stress, especially before examinations, and using low-stakes quizzes or practice tests to help manage anxiety. Second, instructors can promote a mastery-focused climate by balancing the emphasis on performance with encouragement of understanding and long-term learning to sustain more adaptive goal orientations. Third, instructors can provide formative feedback by complementing high-stakes exams with ongoing assessment to strengthen confidence and motivation. Fourth, instructors can acknowledge emotions more openly by discussing coping strategies and by encouraging peer support to help students regulate their emotions.

Future research should further explore the connections between academic emotions, goal orientations, and mental health, potentially drawing on interdisciplinary frameworks such as those presented by Juntunen et al. (2022).

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Exploring the Belief Systems Behind Higher Education Students' Entrepreneurial Intentions: Implications for Entrepreneurship Education[1]

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Abstract

This paper analyses the entrepreneurship-related belief systems of higher education students with high/low entrepreneurial intentions (EIs). Students with diverging EIs from a higher education institution (HEI) in Finland were identified, after which data were gathered in 16 semi-structured causal interviews and analysed using CMAP3, a comparative causal mapping application, to construct individual and aggregated cause maps. The results show that the HEI students have coherent, partly shared belief systems about entrepreneurship and that they reflect the divergent intention levels predictably.

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1 Dedicated to the memory of Professor Emeritus Mauri Laukkanen, the lead author of this article, who passed away prior to its publication.

1. Introduction

This study explores the entrepreneurship-related belief systems of higher education institution (HEI) students who have different entrepreneurial intentions. The background is the increase in entrepreneurship education (EE) in HEIs, understood as pedagogy to develop attitudes and skills relevant to entrepreneurship, entrepreneurial mindsets, or more modestly, to give a general idea of entrepreneurship (Fayolle et al., 2006; Maritz and Brown, 2013).

The proliferation of HEI EE has made the evaluation of EE's impact more important (Duval-Couetil, 2013; Ripollés and Blesa, 2023). However, tracking EE's longer-term effects, such as start-ups and job creation, is difficult. Thus, the common approach is to measure proximate outcomes such as entrepreneurial intentions (EI) (Lorz et al., 2013; Nabi et al., 2017). EI makes sense as an EE result and can anticipate long-gestation behaviours inherent in entrepreneurship (Kautonen et al., 2015; Ripollés and Blesa, 2023). Moreover, EI is pertinent beyond business schools: effects of EE have been established in a variety of fields (see e.g., Souitaris et al., 2007), and in actual startup activity, having a variety of backgrounds is an advantage (e.g., Muñoz-Bullon et al., 2015). New ventures frequently emerge in technology, health, creative, and service sectors, where founders typically do not have a business education, and HEIs typically make EI and related support services available to the entire student body. Joensuu-Salo et al. (2014) showed that once formed, high and low levels of EI remain quite stable. Importantly, EE/EI studies can use survey methods and build upon well-established theoretical bases, usually Ajzen's (1991) theory of planned behaviour (TPB) (Fayolle and Linãn, 2014).

According to the TPB, intentions – "readiness to engage in a behavior" (Fishbein and Ajzen, 2010, p. 38) – depend on attitudes toward the behaviour, social norms, and perceived control of the behaviour, which, in turn, are shaped by the actors' beliefs (Ajzen, 1991; 2002). Generally, TPB studies explain 30–45 % of intentions and around 25 % of behaviours (Armitage and Conner, 2001; Kautonen et al., 2015).

Remarkably, although the TPB posits that actors' beliefs ultimately shape their intentions through the model's antecedents, extant TPB/EI research, though abundant (Donaldson, 2019; Liñán and Fayolle, 2015) in higher education contexts, has not specifically examined the beliefs themselves. Recent studies have addressed, for example, shifts in EI during early-stage entrepreneurship (Hanage et al., 2024), contextual influences on EI and its antecedents (Tchokoté et al., 2025), the interplay of TPB antecedents across cultural contexts (Tekic & Tsyrenova, 2024), and even beliefs as perceived motivators and barriers (Ahmed et al., 2025). However, the micro foundations of beliefs themselves as cognitive phenomena have not been considered. The TPB antecedents are based upon individual belief systems, and while existing studies have illuminated the effects of contexts on antecedents, the underlying mechanism conveying such effects – individual beliefs – remains hidden. This deficiency has been noted in the literature. For instance, Fayolle and Liñán (2014, p. 664) suggested revealing actors' corresponding "… mental prototypes, cognitive scripts, mental schemas, and maps." Nabi et al. (2017, p. 280) call for exploring "…the entrepreneurial mind-set, defined as cognitive phenomena deeper than intent," noting that this is still rare. Recently, Hagger and Hamilton (2024, p. 241) noted in their meta-analysis that longitudinal studies on TPB have largely failed to "…tap the systems of beliefs that underpin the direct measures". A clearer view of the belief systems behind attitudes, social norms and perceived behavioral control will enable a deeper understanding of EI and how it develops.

This study contributes theoretically to higher education studies building on TPB and especially EE research by addressing the above knowledge gap. We examine the TPB postulate that beliefs underlie and influence intentions, in this case, entrepreneurial intentions. If this is so, it implies that should actors' EIs differ markedly, their corresponding belief systems are also divergent. We elicit and compare the entrepreneurship-related belief systems (BS) of two groups of HEI students whose EIs differ diametrically, using data gathered from an HEI in Finland. To our knowledge, this is the first study to analyse the belief systems of higher education students with high/low entrepreneurial intentions. Second, the study contributes methodologically by using comparative (cognitive) causal mapping (CCM) (Ifenthaler et al. 2011; Laukkanen and Wang, 2015) to present and analyse belief systems. Third, pragmatically, the study hopes to contribute to HEI EE by emphasising the cognitive viewpoint. This can offer new insights into developing HEI EE strategies and methods. For example, whilst present TPB/EI studies can track students' EIs, they do not help understand what cognitive changes underlie EI variation, such as why EE sometimes reduces students' EIs (Bae et al., 2014; Joensuu et al., 2013; Zhang et al., 2022).

2. Conceptual background

2.1 Beliefs and belief systems

Beliefs can be defined as "… propositions about the world which are (consciously) held to be true" (Good and McDowell, 2015, p. 493), in other words, persons' subjective knowledge that certain entities like A or B exist, have properties X or Y, and may cause or follow from some other entities C or D. The cognitive function of belief systems is to provide people "…ontological representations of the world… [and] comprise primary convictions about events, causes, agency, and objects that subjects use and accept as veridical." (Connors and Halligan, 2015, p. 1). The human ability of symbolic thinking and mental representation is critical for social communication but especially for reasoned behaviour. It facilitates comprehending and understanding what exists, happened, or might happen in the external reality (Johnson-Laird, 2010; Kahneman, 2012).

As a practical consequence, people accumulate, over time, large repositories (Chi and Ohlsson, 2005) of items and structures of subjective knowledge," … analogues of real-world or imaginary situations, events, or processes" (Nersessian, 2002, p.141). These are stored in the long-term memory (LTM) and, when necessary, recalled to and processed in the limited-capacity working or short-term memory (STM) (Baddeley, 2010) for constructing transitory (causal) mental models that represent the perceived actual situation (Johnson-Laird, 2010; Markman and Gentner, 2001). We use the term belief systems (Bandura 2001; Connors and Halligan, 2015) to refer to the recalled relevant LTM contents and outcomes of momentary STM reasoning, activated in a problem-solving situation. Figure 1 summarises the basic cognitive processes.

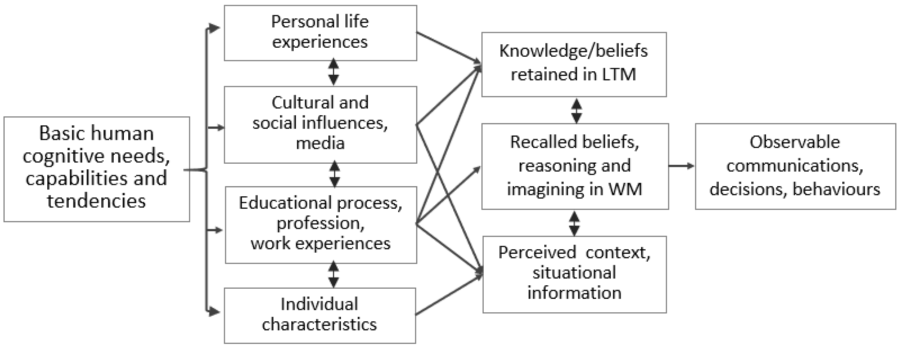


Figure 1: Basic factors and processes in belief formation. Authors' elaboration.

The TPB postulates that beliefs shape EIs via the antecedent factors implies facilitating cognitive processes. They can be understood by considering problem-solving in general (see, e.g., Fiske and Taylor, 2021; Johnson-Laird, 2010). Faced with a problem-solving task in real life or artificial situations, say responding to TPB/EI surveys, people usually first try to recall from the LTM relevant knowledge and mental models for the emerging situational mental model. This involves quickly running and developing the model in the STM by simulating "in the mind's eye" (Johnson-Laird, 2013) how the respective real or imagined situation or phenomena work, might work, or may have worked, depending on the case. The key is our innate capability of cognitive decoupling, which enables remembering relevant situations and imagining hypothetical ones so as to perform if-then thought experiments on them (Evans and Stanovich, 2013). The process ends when a momentarily subjectively satisfactory result has been reached, enabling registering mentally a solution or overt reactions such as a survey response.

2.2 Origins and formation of beliefs

Human cognition involves highly complex phenomena. There are, however, a number of established basic notions which are important for understanding and predicting, at least tentatively, the HEI students' thinking about entrepreneurship and business. To begin with, the students can be assumed to have coherent beliefs about entrepreneurship and business. This follows from normal people's basic need to comprehend what goes on and why in their worlds (Fiske and Taylor, 2021; Kahneman, 2012). This may imply deliberate reasoning and information search, sometimes more instinctive processes, which provide a momentarily satisfactory, quick solution or answer.

However, cognitive activities are hampered by the limited processing capacity of the working memory (Baddeley, 2010). In addition, deliberate problem-solving and information acquisition consume energy and time. Such basic constraints, together with the vastness of potential information, place severe limits on what someone can and is prepared to actively perceive and process. Hence, over time, people learn to behave as cognitive economisers. They adopt cognitive routines and biases as shortcuts for generating quick, at least momentarily satisfactory solutions (Fiske and Taylor, 2021; Kahneman, 2012).

The cognitive limitations and dispositions have significant consequences. First, they influence how imaginary or future situations — e.g., becoming or being an entrepreneur—are represented in the mind. The construal level theory (CLT) (Trope and Liberman, 2010) calls mental representations construals. They can be abstract and decontextualised or specific and concrete. According to CLT, this depends on the target's psychological distance, usually hypotheticality, or its spatial, social, or time-related distance (Trope and Liberman, 2010; Wiesenfeld et al., 2017). The higher the situation's psychological distance, that is, the less relevant it seems practically, the more abstract the construal.

Second, to manage the need to explain and comprehend, people have a number of explanatory capabilities and tendencies; some inherent, some learned (Fiske and Taylor, 2021; Kahneman, 2012). They facilitate the momentary generation of new, perhaps tentative causal explanations and underlie the formation of retained causal beliefs. Three theoretical notions seem relevant.

The first is our probably inherent ability, usually called the theory of mind (TOM) (Bender et al., 2017), which facilitates projecting one's own ideas and thinking to other people (Fiske and Taylor, 2021). This is useful when surmising about what others think and when trying to understand and explain their past or future behaviours.

The second propensity, fundamental attribution disposition (FAD) (Ross, 1977), refers to a common tendency to explain observed events or phenomena by salient external factors whilst attributing other people's behaviours to their internal traits, motives or abilities (Hodgkinson et al., 2023). Thus, a person's behaviour may be explained by assuming he has unique faculties, compelling conditions or some specific function or purpose (Westmeyer, 2001). FAD appears stronger in Western individualist cultures, which emphasise independence and individual responsibility and goals (Fiske and Taylor, 2021; Hofstede et al., 2010). For the HEI students, the above dispositions facilitate subjective explanations or conjectures, e.g., about the behaviours of entrepreneurs and other relevant individuals like customers or family members. Consequently, the students should have corresponding causal beliefs and be able to express them.

The third notion is avoidance of cognitive dissonance (ACD). The original theory of cognitive dissonance (Festinger, 1957) generally refers to seeking mental consistency between one's previous behaviour and conceptions and encountered new observations or propositions. In practice, this is manifested in selecting and/or prioritising information which supports previous behaviours, thinking and goals. Sometimes people avoid, even actively reject, contrary ideas and views (Fiske and Taylor, 2021).

Studies of cognitive dissonance mainly examine people's efforts to remove perceived dissonance (Fiske and Taylor, 2021). However, it is also important to consider what makes the new something consonant or incompatible in the actor's mind. As to the HEI students, it is probably their visions about their future career and perhaps some preconceptions of entrepreneurship that define their personal attitudes and feelings about entrepreneurship and especially about becoming an entrepreneur. This can be conceptualised as a positive or negative entrepreneurial identity (Donnellon et al., 2014; Radu-Lefebvre et al., 2021). The HEI students' entrepreneurial identities, possibly still in a liminal stage (Hayter et al., 2022), should be manifested in the beliefs they express.

In addition to individual-level factors, people's behaviour is guided by what they know and have learned to think and believe, i.e., the contents of their cognitions. These reflect national and local cultures, and past and ongoing social transmission within early and professional education and, for instance, media (Chi and Ohlsson, 2005). The cultural impact involves long-term, often tacit processes whereby beliefs and assumptions, widely shared in the society, get gradually transmitted (Bender et al., 2017; Hayton et al., 2002; Hofstede et al., 2010). The HEI students' national (Finnish) culture is known to emphasise individualism and uncertainty avoidance. Moreover, the students have grown up and live in a developed market economy society. This means being exposed to and gradually accumulating notions about entrepreneurship through education, everyday contacts, exposure to media, etc.

2.3 Disclosing and describing belief systems

Belief systems (BSs), like mental models (or attitudes or intentions, etc.) are theoretical, not directly accessible and observable constructs. Whilst specific beliefs can sometimes be inferred from people's behaviours, studying belief systems and thought patterns requires expressing the beliefs in common symbols, usually an established language (Smith and DeCoster, 2000). This study uses semi-structured causal interviewing to elicit HEI students' entrepreneurship beliefs. The resulting data consists of original causal propositions, which correspond to the respondents' individual beliefs, expressed in their natural language (Finnish). The comparative analysis of individual respondents' BSs requires the original data to be coded/standardised and expressed using a standard language vocabulary (English). This enables representing the students' BSs as individual cause maps (ICM). By intersecting the individual cause maps, it is possible to generate aggregated cause maps (ACM), which represent the students' widely shared, i.e., typical, belief systems.

Using cause maps provides important advantages compared with describing and analysing elicited BSs in text form, common in ethnographic studies (Johnstone, 2007). First, from a theoretical viewpoint, belief systems are, by definition, essentially networks of causal propositions (a→b, b→c, etc.) which consist of actors' phenomenological (a, b) and causal (a→b) beliefs (Hoffman and Klein, 2017; Sloman and Lagnado, 2015). The nodes and arrows of cause maps thus provide a theoretically grounded and intuitive metaphor for representing BSs. Second, cause maps facilitate, better than text form, comparing several actors' belief systems, a precondition of exploring the differences and changes in actors' BSs or distilling typical or core beliefs BS (Laukkanen and Wang, 2015).

2.4 Predicting the HEI students' belief systems

Based on the theoretical discussion, it can be predicted that the HEI students have coherent, partly interlinked BSs about entrepreneurship and business. Moreover, their normal cognitive dispositions and common social and cultural factors suggest that the BSs are partly shared. Hence,

> H1: *The HEI students have, first, coherent but general BSs about entrepreneurship and business, irrespective of EI intensity. Second, there is a core system of beliefs, which is shared by most participants.*

H1 follows from the common formative factors and is confirmed if coherent aggregated cause maps (ACM) can be generated. Aggregated cause maps are intersections of the individual cause maps (ICMs), which represent individual belief systems. If the individual cause maps share several nodes and causal links, complex aggregated cause maps can emerge, representing the widely shared BS.

H2: *The belief systems of the high EI students are more complex than those of the low EI students.*

TPB postulates that beliefs shape intentions. Thus, if the students' EIs differ clearly, so should their BSs. At the simplest level, this is manifested in the BSs' complexity; the detail and relative numbers of concepts and causal relationships. H2 follows from the construal level theory (CLT). CLT predicts that students' representations about entrepreneurship depend on perceived psychological distance, in this case mainly hypotheticality and temporal distance, i.e., how likely (unlikely) they consider personal entrepreneurship, and how far (close) temporally that is. If so, the high EI students' BSs should, on average, be more specific and detailed than those of the low EI students.

This study operationalises students' BSs as individual cause maps, which facilitates comparison of BSs' complexity and, indirectly, the abstractness/specificity of the students' concept base using the CCM indicator density. Thus, H2 predicts that the high EI students' individual cause maps are, on average, denser and contain more nodes and causal links than those of the low EI students.

H3: *The BSs of high EI students are mutually more convergent and uniform, those of low EI students are more divergent.*

Whilst the CLT provides one explanation for the HEI students' BS complexity, it does not explain the BSs' within-group convergence or divergence. This can be anticipated by considering the implications of cognitive dissonance avoidance and the students' assumed entrepreneurial identities. The background of H3 is that becoming an entrepreneur is, for most Finnish HEI students, still a risky and uncommon career alternative. The high EI students, however, perceive entrepreneurship as a serious option and see it in more positive terms, even if they know of the prevalent, generally negative views. Their perhaps still liminal entrepreneurial identity and avoidance of cognitive dissonance (ACD) imply that their BSs should be more convergent. In comparison, the low EI students' entrepreneurial identities can be considered neutral or negative; their career intentions are "normal" and need not be "defended" to themselves or others. Thus, in their case, the impact of entrepreneurial identity and ACD is weak, suggesting random and thus less uniform BSs.

The CCM method provides two indicators of the within-group uniformity. One is the saturation of the respondents' active concepts (ICM nodes). If it happens early, the group members conceptualise the focal issues similarly. The second is the correspondence/distance index (C/DI). It indicates (in percentage) how widely respondents share concepts (ICM nodes) with other members of the group.

H1 to H3 concern structural aspects of the BSs. Arguably, theoretically, it is more interesting whether the BS contents differ. This can be predicted by conjecturing how the theory of mind (TOM) and especially the fundamental attribution disposition (FAD) could be manifested in the students' entrepreneurship beliefs. TOM provides both capabilities and incentives to speculate, especially about the behaviour of an entrepreneur and other relevant actors, whereas FAD implies a bias to explain one's positive outcomes by one's capabilities and negative ones by situational factors, other persons' errors and problems resulting mainly from their inherent qualities, not external factors. Here, TOM and FAD may have at least twofold cognitive effects. First, all HEI students should emphasise the salient and manifold role of individual entrepreneurs. Second, the high EI students' positive, if emergent, entrepreneurial identity suggests that they perceive themselves as potential entrepreneurs so that their BSs conform with the internal/external attribution logic of FAD, prevalent in management (Hodgkinson et al., 2023). If so, their BSs would contain more references to external factors than the BS of the low EI students.

H4: *Both high and low EI students emphasise the role of the individual entrepreneur and of related factors as main reasons for the emergence of firms and for different outcomes. However, high EI students also note more external and firm-related factors as explanatory factors.*

The effects should be salient particularly in the students' beliefs that explain positive or negative entrepreneurial performance. The CCM method facilitates examining this using so-called Focal Maps, which display the causes and consequences the HEI students attribute to entrepreneurial success and failure.

3. Research context and methodology

3.1 Research context and respondents

Comparing the individual BSs of actors whose EIs differ calls for finding participants with clearly divergent EIs and eliciting valid, systematically comparable data. As part of their entrepreneurship-oriented strategy, the HEI cooperating in the study collects entrepreneurship-related survey data annually, including data about the students' EIs. The instrument has been piloted and validated in several HEIs. Potential participants were listed based on the survey among the students, now in their second study year. High EI students were defined as students whose EI mean ranged from 6 to 7 (n=105); low EI students as those having a mean EI ranging from 1 to 2 (n=130) (scale 1-7). These students received an email with three Likert statements to check their current EI status, describing the project and inviting them to participate.

A final sample of students willing to participate was identified after two rounds of emails. It included seven engineering students from different study programmes, four business students, three students from healthcare and social work, and one student studying cultural management. Ten studied in regular programmes and six in multimodal programmes. Based on their Likert responses' mean EIs, two groups of 8 respondents were formed, called the EI-pos and the EI-neg group (Table 1). The mean age of the EI-pos group is M=26.13 yrs. (5.59), that of EI-neg group M=33.50 (10.84). Both groups have 4 female and 4 male students. As shown, the group's mean EI scores differ clearly.

Previous research (Guest et al., 2020; Hennink and Kaiser, 2022) shows that, when studying relatively homogeneous groups, accessing as few as 6-7 members generates theoretically saturated data quite sufficient to identify the group's typical belief patterns. The final number of participants can be considered satisfactory for this study's purposes. As discussed more below, the fast saturation of the respondents' active concepts indicates widely shared typical belief systems.

3.2 Comparative causal mapping (CCM)

The knowledge/belief base of normal persons is very large (Chi and Ohlsson, 2005). Thus, their beliefs can be captured only as far as they concern specific issues or domains (Evans, 1998; Ifenthaler et al., 2011). This study elicited the original data by semi-structured causal interviewing

(SCI) starting around four anchor topics: (1) Why does one become an entrepreneur and what results from that; (2) What hinders becoming an entrepreneur? (3) Why do entrepreneurs and their businesses succeed and what follows? (4) Why do entrepreneurs and their firms fail and what results from that? The causal interviews were conducted via online video.

At the outset, the respondents were asked about background data and their studies. The causal interviews began by inquiring about the first topic, starting with what the respondent perceives causes individual entrepreneurship. This elicits a first batch of natural concepts and causal relationships. Next, the elicited concepts were used as new anchors, asking about their causes, eliciting a second batch of original concepts and causal propositions. After that, the respondents were inquired about the consequences of becoming an entrepreneur and then about the consequences of these notions. After the first anchor topic, the other topics were addressed similarly. In this study, only the causes of the first batch and the consequences of the first-batch effects were addressed. The interviews' length varied (range 40-109 min) (M=75.75 min, SD=19.64).

Causal interview data consists primarily of causal propositions, not free-flowing discourse, which simplifies and fosters reliable data processing and interpretation. The original causal propositions (a→b, b→c, etc), called natural causal units (NCU), consist of a pair of original concepts (a, b, c, etc.), called natural language units (NLU). They represent the respondents' perceptions that something influences or follows from something else. Altogether, the original data contained 1768 NLUs and 2234 NCUs (Table 1). They were entered into CMAP3, a CCM application, and coded/standardized and processed, generating two databases, one for the standard node terms (SNTs), the other for the standard causal units (SCUs). CMAP3 can generate from the individual cause maps aggregated causal maps (ACM in Figs 1,2) to represent shared/core belief systems. CMAP3 also calculates CCM statistics and indicators like cause map densities and the distances of the ICMs (Table 1).

In CCM studies, the belief systems originally expressed in natural language require standardising (coding) (Laukkanen and Wang, 2015). Standardising assigns the elicited NLUs into standard node term (SNT) categories that correspond to the NLUs' referents and meanings. In the process, the NLUs (in Finnish) are also translated into a standard language (here English). Notably, this study's standardising was at a low level (Laukkanen and Wang, 2015), meaning that the standard term vocabulary (STV) is, with some exceptions, close to natural language. The coding was assessed by two expert reviewers. Some changes were suggested. The high intercoder reliability (ICR=99.19%), a measure recommended for similar cases (McHugh, 2012), indicates essential agreement with the original coding and thus satisfactory (semantic) validity.

4. Findings

4.1 Individual and core belief systems

According to H1, the HEI students have coherent but general individual belief systems about entrepreneurship and business and also shared, typical beliefs. The first assumption concerning individual BSs is supported. All respondents have relatively high numbers of active standard node terms (SNT) and standard causal units (SCU) (Table 1). However, the complexity of individual cause maps varies, shown by the different SNT and SCU numbers and the ICMs' densities. At the original data level, the variability is even more pronounced, indicated by the NLU and NCU numbers. NLU standardisation neutralises some of this by compressing the original data.

The second H1 issue concerns the sharedness of the HEI students' individual BSs represented by their individual cause maps. This, too, can be assessed using two CCM indicators (Table 1). The first is the saturation of the respondents' active concepts. The within-group cumulation (STN satur.%) is fast as shown in Table 1. If the accumulation of the respondents' SNT base (n=81) is examined in interview order (not shown), the majority of the SNTs (75.3%) already emerge by the 3rd respondent and practically all SNTs (97.5%) by the 8th participant, i.e., half of the total sample. After this point, the SNT base grew only by two infrequent SNTs.

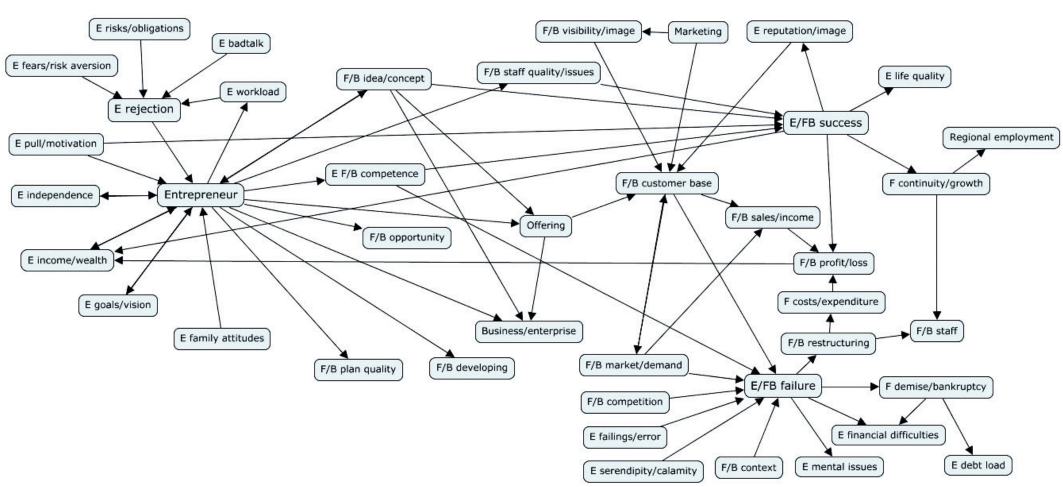
Table 1: Summary of the study's EI and SCI/CCM data. (Source: authors).

Measure	**Total**	**EI-pos group**								**M**	**SD**	**EI-neg group**								**M**	**SD**
Participant		S01	S02	S03	S04	S05	S06	S07	S08	-	-	S11	S12	S13	S14	S15	S16	S17	S18	-	-
EI Score (1	-	4,67	7,00	7,00	6,00	6,33	5,33	4,00	5,33	5,71	1,08	3,33	2,33	1,33	1,33	3,00	1,33	1,00	1,00	1,83	0,93
SNT (2	81	42	56	45	62	58	59	59	65	55,75	8,07	39	36	51	50	64	54	55	49	49,75	8,91
SCU	842	93	118	86	139	145	110	134	182	125,88	31,03	62	65	89	102	132	104	115	96	95,63	23,67
NLU	1768	97	109	74	135	131	117	129	176	121,00	30,07	68	69	98	114	123	100	130	98	100,00	22,73
NCU	2240	132	150	103	171	176	133	168	237	158,75	40,03	80	78	111	137	160	127	151	126	121,25	30,16
NLU/SNT (M)	-	2,31	1,95	1,64	2,18	2,26	1,98	2,19	2,71	2,15	0,31	1,74	1,92	1,92	2,28	1,92	1,85	2,36	2,00	2,00	0,21
DENSITY	-	2,87	3,64	2,65	4,29	4,48	3,40	4,14	5,62	3,89	0,96	1,91	2,01	2,75	3,15	4,07	3,21	3,55	2,96	2,95	0,73
SNT satur. % (3	-	0,538	0,800	0,875	0,950	0,988	0,988	1,000	1,000	-	-	0,500	0,638	0,788	0,863	0,938	0,975	1,000	1,000	-	-
C/DI % (M)	-	0,602	0,651	0,609	0,707	0,655	0,672	0,669	0,698	0,66	0,04	0,551	0,527	0,594	0,617	0,646	0,598	0,578	0,584	0,59	0,04

Legend: 1) Mean of responses (scale 1-7) to propositions measuring current entrepreneurial intentions (Footnote 3); 2) SNT=standard node term, SCU=standard causal unit, NLU=natural language unit, NCU=natural language causal unit; 3) For Density, SNT saturation % and C/DI, please see text.

The second measure is the correspondence/distance index (C/DI %) (Table 1). It shows (in percentage) how widely the participants share SNTs. If calculated for all respondents, the overall C/DI % (M=0,587 SD=0,039) indicates that ca. 60 percent of active SNTs are shared. This and the saturation measures suggest that HEI students' underlying individual BSs are partly convergent.

Figure 2: HEI students' core belief system about entrepreneurship and business. (Source: authors).



CCM enables assessing H1 also qualitatively. For this purpose, Figure 2 shows an aggregated cause map (ACM) representing the HEI students' widely shared belief systems. It contains 42 SNTs and 64 SCUs, some reciprocal (two-way arrows). The TF (=number of owners) of the SNTs is M=11.10 (SD=3.81), meaning that the aggregated cause map is shared practically by all or a large majority of the respondents.

The aggregated cause map supports H1. An aggregated cause map as complex and coherent as this cannot emerge unless the underlying individual cause maps are sufficiently detailed, coherent and widely shared. As with cause maps generally, the key contribution of the aggregate cause map is that it provides an overall view of the contents of the HEI students' widely shared thinking about entrepreneurship and business as an interconnected system of the distinct phenomena and causal relationships which most HEI students perceive. Thus, unlike numerical measures of complexity or abstractness, the aggregate cause map facilitates mentally simulating and thus understanding and predicting how typical HEI students might think about entrepreneurship-related issues.

Whilst the aggregate cause maps' contents are self-explanatory, it may be noted how the map summarizes the HEI students' perceived key reasons for becoming an entrepreneur and factors that hinder or cause rejection of entrepreneurship. The salient role of the entrepreneur and his characteristics and capabilities is notable.

4.2 Between-group complexity and within-group uniformity

H2 was based on the construal level theory (CLT). The assumption was that the BSs of the EI-pos group are more complex than those of the EI-neg group. H2 is supported by the SNT and SCU numbers of the EI-pos groups, on average higher than those of the EI-neg group, and especially by the higher average density of the EI-pos students' ICMs. However, the between-group difference is perhaps not as large as one might expect, considering the groups' divergent average EI levels/scores.

H3 predicted that the BSs of the EI-pos group are mutually more uniform, and those of the EI-neg group are more divergent. This is related, first, to the fact that the EI-pos students intended to eventually set up a business, whilst the EI-neg group did not. Second, the CLT suggests that the EI-pos group should need more business-related concepts, which are still mainly general at this stage. This and their emerging E-identity, based on the impact of ACD, should have a unifying influence on their BSs.

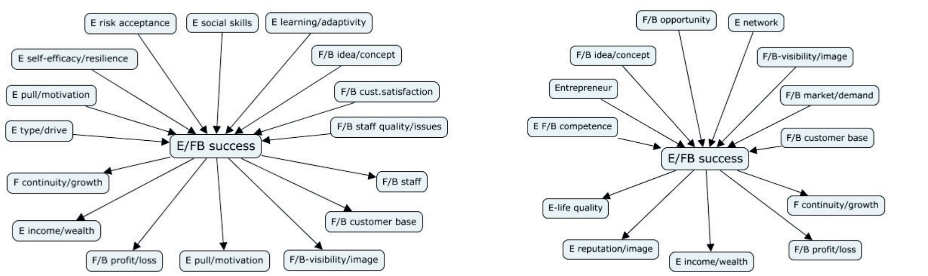
The data broadly supports H3. First, SNT saturation occurs earlier in the EI-pos group: 95 % of the active SNTs emerge by the 4th respondent, in the EI-neg group later, by the 7th respondent. Second, the C/DI measure indicates higher internal uniformity of the EI-pos group (C/DI M=0.66 v. 0.59). However, the differences are not dramatic. Both groups use and share mainly general notions and lack concrete business contexts, which would require adopting more contextualised concepts.

4.3 Belief system contents

H4, based on the fundamental attribution disposition (FAD), predicted that both groups would emphasise the overall role of the entrepreneur and entrepreneur-related internal factors. The aggregate cause map in Figure 2 supports this. Second, the combined impact of FAD and different assumed levels of entrepreneurial identity was expected to mean that the EI-pos group perceive things more from the viewpoint of an entrepreneur, in particular emphasising the impact of external factors.

H4 requires examining the two groups' causal attribution patterns. CMAP3 facilitates doing this by Focal Maps (FM), which display the respondents' perceived proximate causes and effects of a phenomenon (SNT). How the groups view the success and especially the failure of entrepreneurs and their business is particularly revealing. In the interviews, these issues were discussed separately. Because many respondents had difficulties in conceptually distinguishing the performance of the entrepreneur from that of the business, the notions were combined into two synthetic SNTs (E/FB success, E/FB failure). Two focal maps (Figures 3, 4) were generated for both groups. To exclude predominantly idiosyncratic notions, the focal maps contain cause or effect SNTs that are shared at least by 3 of the 8 group members.

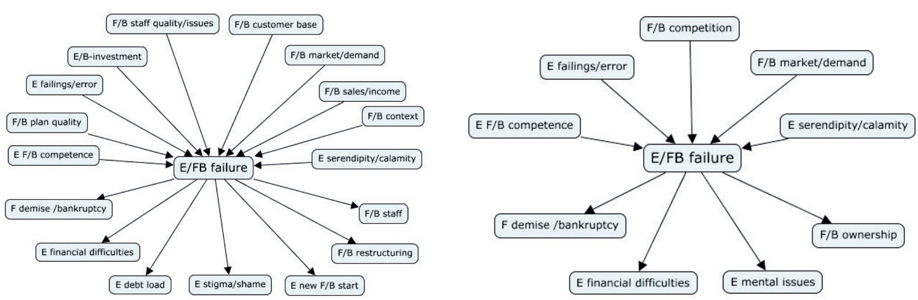
Overall, the focal maps indicate a higher complexity of the EI-pos group. In terms of E/FB success and E/FB failure, the two groups' attribution patterns are partly similar but different in some important respects. As reasons for E/FB failure, HEI students typically refer to the entrepreneur or some specific traits, but also to external factors like competition or unfavourable events. As the consequences of E/FB failure, both groups note first F demise/bankruptcy and the ensuing financial difficulties and debt load for the entrepreneur, but the EI-pos group seems aware that crises may be solved by appropriate measures, sometimes by starting anew. For the EI-neg group, the positive solution is to sell the business or to find a partner. Both groups believe that a E/FB failure can have personal psychological and social consequences.



EI-pos group (n/SNT 9+7) EI-neg group (n/SNT 8/5)

E = entrepreneur, F=firm, F/B=firm or business

Figure 3: Focal maps showing HEI students' shared beliefs about the success of the entrepreneur and the business.



EI-pos group (n/SNT 10+7) EI-neg group (n/SNT 5/4)

E = entrepreneur, F=firm, F/B=firm or business

Figure 4: Focal maps showing HEI students' shared beliefs about entrepreneurial and business failure.

As for E/FB success, for both groups it means above all that the founded firm is profitable and has continuity, possibly also grows, providing higher income and generating wealth. The EI-pos group also stress external consequences such as a positive impact on the firm's visibility/image, the customer base and the firm's personnel. The EI-neg group focus more on personal outcomes like the entrepreneur's life quality and a favourable reputation and image. Notably, while both groups emphasise the role of the entrepreneur in explaining success, this is more salient in the EI-pos group, who attribute successful performance mainly to entrepreneurs' personality and internal characteristics. The EI-neg group note also external factors as possible determinants of performance.

The different views of the causes of E/FB failure are enlightening. First, both groups believe that it can be caused by entrepreneur-related factors, in particular weak competence, errors and personal failings. Second, the EI-pos group emphasise clearly more external factors such as the business context, market, demand, and unpredictable unfavourable events. This may be interpreted to indicate the influence of FAD and of entrepreneurial identity, however tentative at this stage.

In conclusion, the aggregated cause map (Figure 2) suggests that both groups' reasoning about this is partly similar, reflecting the shared unifying factors, but that there are also revealing differences. As for the similarities, for most respondents, the core reason for becoming an entrepreneur is E independence, followed by E income/wealth. Less frequently noted are F/B idea/concept and E family attitudes. As to the differences, the EI-pos group emphasise E goals/vision and E self-efficacy/resilience, the EI-neg group E pull/motivation. Further differentiating factors of the EI-pos group are F/B market/demand, E-job/self-employment, F/B financing/sources, E risk acceptance and E-life quality. Correspondingly, the EI-neg group notes specifically E type/drive, F/B opportunity and E family firm/takeover. As to E rejection, for both groups, the main factors are E risks/obligations, E workload and E badtalk. The EI-neg group also emphasises E fears/risk aversion.

5. Discussion

5.1 Interpreting the findings

This study's starting point was to examine the TPB premise that beliefs shape actors' intentions, in this case, the entrepreneurial intentions (EI) of HEI students. The findings show that the responding students have coherent, even rather detailed, and partly shared belief systems (BS) about entrepreneurship and business. Moreover, their BSs differ in terms of content, complexity, and mutual uniformity, reflecting the students' divergent EI levels as predicted. The findings support the TPB/EI postulate and provide new evidence of the underpinning of EIs as requested in the literature (Nabi et al., 2017).

However, the findings also suggest that the mechanisms of EIs are more complicated. Clues to this are the divergent notions concerning causes or consequences of key issues like E/FB failure and E rejection. On the one hand, the EI-neg group emphasise entrepreneur-related factors and entrepreneurship's negative consequences. This suggests attitudes of informed, risk-averse observers, personally uninterested in entrepreneurship. The EI-pos group — although aware of the negative aspects of entrepreneurship — has more complex and more uniform belief systems. More importantly, their attribution patterns contain more references to operational and external factors and positive outcomes. They seem to have adopted a tentative entrepreneurial viewpoint, indicating an embryonic entrepreneurial identity. If the inferences are valid, it follows that understanding and especially influencing entrepreneurial intentions may require going behind the readily expressible beliefs, studying the level and backgrounds of entrepreneurial identities (Hayter et al., 2022), especially when actors' overt BSs do not differ as markedly as their EIs. These patterns also speak directly to the knowledge gap identified in recent TPB and EI research. While antecedents such as attitudes, subjective norms and perceived behavioural control are well established, their underlying belief foundations remain insufficiently understood (Fayolle & Liñán, 2014; Hagger & Hamilton, 2024). Our findings show that students' divergent EI levels map onto clearly distinguishable belief configurations: risk-centred and person-focused beliefs among the EI-neg group, and more operational, externally oriented and opportunity-focused beliefs among the EI-pos group. In this sense, the BSs uncovered here provide a more fine-grained view of how antecedents are cognitively constituted, thereby offering empirical traction on the 'hidden layer' of beliefs that recent studies have highlighted as crucial but largely unexplored (Ahmed et al., 2025; Hanage et al., 2024)

Whilst a further discussion of these issues is beyond the present scope, it is interesting that some of the students explained their negative entrepreneurial identities by traumatic family firm experiences or simply by good self-knowledge, suggesting that both rational-cognitive and emotional factors are involved. In developing a professional identity (e.g., Kantanen et al., 2020), relatedness and integration to the academic community play important roles in HEIs, but for the development of entrepreneurial identities, the roots of identity may lie elsewhere. This suggests entrepreneurship-oriented student communities are needed.

In general, the findings support the theoretically predicted basic mechanisms of belief formation. As for the cultural-social transfer of knowledge and explanation patterns (Bender et al., 2017; Hayton et al., 2002), the HEI students' BSs reflect the individualistic thought patterns characteristic of Western market economy societies and especially of the students' own (Finnish) culture. Furthermore, their BSs reflect common individual cognitive capabilities and tendencies, in particular the theory of mind, fundamental attribution disposition (Hodgkinson et al., 2023), and avoidance of cognitive dissonance (Festinger, 1957). However, the present SCI/CCM findings provide only indirect, conjectural evidence of the level and impact of the students' entrepreneurial identity. They suggest, however, a plausible hypothesis and a probably fruitful direction for further EI research (Radu-Lefebvre et al., 2021).

The study also contributes by demonstrating how semi-structured causal interviewing (SCI) and comparative causal mapping (CCM) facilitate revealing and analysing entrepreneurially relevant cognitions at the individual or group level. Importantly, CCM facilitates the comparative designs required by explanatory and longitudinal research of knowledge structures, difficult when using text form or the panel-based methods of CLT studies (Krüger et al., 2014). Studying group-level belief systems needs uniformly elicited, i.e., comparison-enabling original data, which calls for semi-structured interviewing. As shown here, faster, cost-effective online techniques may also work, depending on the respondents.

5.2. Implications for entrepreneurship education

The study contributes mainly by illuminating the relevance and implications of the cognitive perspective, arguably not sufficiently observed in the HEI EE context. This is indicated by common complaints that EE tends to reduce EIs, or that so few HEI students become entrepreneurs after their studies, if at all (Block et al., 2023; Lahikainen and Pihkala, 2021; Nabi et al., 2017).

Such behaviours are not surprising from a cognitive perspective. As shown here, a key factor is that typical students seldom have in mind a concrete business to pursue, although they generally view entrepreneurship positively. Not actively thinking about entrepreneurship is rational behaviour if one has a vital current task, such as ensuring a degree.

Should HEIs do something so that more students have and will actively pursue concrete business ideas? There is no unequivocal answer. On the one hand, it is common to proclaim that the main purpose of HEI EE is to generate individuals with entrepreneurial mindsets and capabilities, applicable in every sphere of life (Bacigalupo et al., 2016; Fayolle et al., 2006). On the other hand, it is evident that for many, the real purpose of HEIs' EE is that the so-educated individuals eventually create new ventures – otherwise, why the regular measurement of entrepreneurial intentions? Paradoxically, typical HEIs tend to follow the first, education-centred strategy, whilst exceptionally entrepreneurial HEIs alone use proactive and generative practices (for Finland, cf. Viljamaa, 2016). They link students with real firms and have systems that search and generate, within the HEI and outside, business ideas and innovations and follow them up (Laukkanen, 2000; Malecki, 2018).

The results suggest HEIs might examine their pedagogical approaches. For example, introductory entrepreneurship courses should inculcate realism about entrepreneurship (Block et al. 2023; Joensuu et al., 2013), both its positive and negative aspects, e.g., in the form of entrepreneurs' accounts of their journeys. Beyond introductory courses, EE must, for practical reasons, focus on the students most drawn to entrepreneurship. For them, e.g., intensive work with cross-disciplinary teams in focused development sprints on self-selected ideas would be ideal, accompanied by micro-learning modules available on demand. In later stages, experimenting with, field-testing, perhaps pivoting and finally pitching potential business ideas to entrepreneurs and potential financers would offer a hands-on learning opportunity. With such experience, initially simulated but with the potential to be realized, students have the opportunity to act as entrepreneurs. Thereby, the students' crucial entrepreneurial identity and self-efficacy will develop naturally (Donnellon et al., 2014). On the institutional level, HEIs should consider entrepreneur-in-residence schemes, developing mentoring opportunities linking students with, e.g., alumni entrepreneurs, and finally, explore the possibility of awarding credits for validated extra-curricular ventures.

5.3 Future research

First, the study suggested that the HEI students' entrepreneurial identity can be a root factor influencing their cognitive dispositions and reasoning processes and thus entrepreneurial intentions and behaviours. Despite the extensive literature on entrepreneurial identity (Donnellon et al., 2014; Radu-Lefebvre et al., 2021), further research is arguably needed to better understand how entrepreneurial identities emerge, change, and disappear in specific HEI contexts with different EE practices. Furthermore, as the impact of family business background on entrepreneurial identity development is well established (e.g., Bagherian et al., 2025; Shepherd & Patzelt, 2018), future studies could examine the nexus of HEI EE and family business background in terms of cognitive development.

Second, we did not examine the different subjective weights that the HEI students assign to their entrepreneur-related beliefs. This can be important theoretically and for EE practice when evaluating and planning educational measures.

Third, it would be important to replicate this study in a different context with respondents who represent divergent entrepreneurial intentions and identities. While there are clear practical difficulties in locating such respondents, a conceivable context could be, e.g., small business advisory services for aspiring entrepreneurs.

6. Conclusions

The study finds that the HEI students have coherent, even detailed, yet general beliefs about entrepreneurship and business, and that the belief systems of students whose entrepreneurial intentions (EI) differ clearly, also differ logically in several respects and in line with theoretical expectation. However, the found BS divergences are not dramatic, suggesting that educated persons may, irrespective of their attitudes towards entrepreneurship, possess a number of coherent ideas and notions about entrepreneurship. This suggests that understanding EIs still better requires going beyond the level of expressed belief systems and exploring the underlying entrepreneurial identities. Methodologically, the study shows that semi-structured causal interviewing (SCI) and comparative causal mapping (CCM) enable revealing and comparatively analysing belief systems.

Finally, it was noted that the accustomed, mainly educational approaches to EE in higher education need more consideration. Of all nationwide institutions, the HEIs have a unique strategic position and capability to contribute entrepreneurially to the country's economic development. Assuming HEIs' third mission, they should increasingly augment the current EE methods with more proactive, generative strategies.

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- Research notes

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