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.

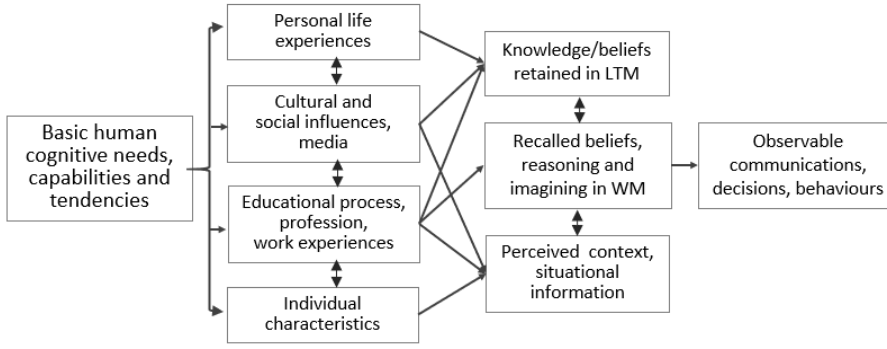


Figure 1: Basic factors and processes in belief formation. Authors' elaboration.

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.

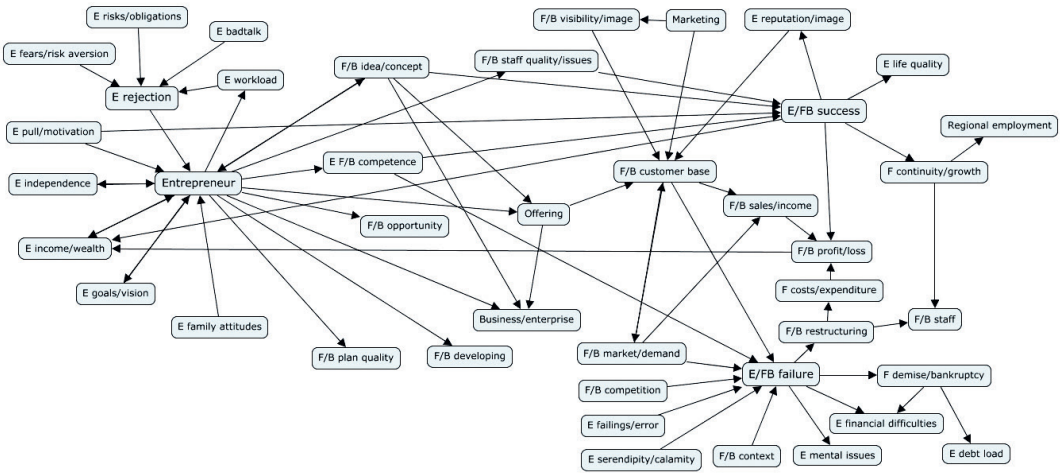
Table 1: Summary of the study's EI and SCI/CCM data. (Source: authors).

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.

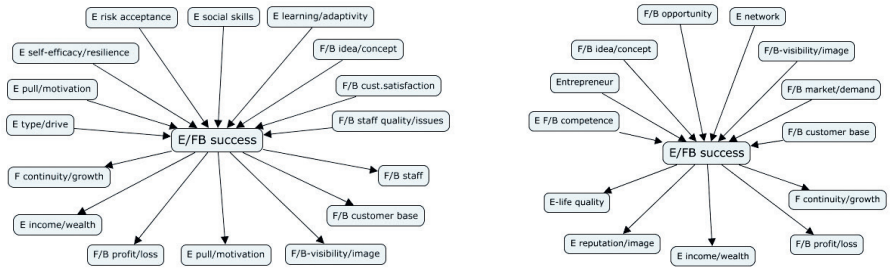
4.3 Belief system contents

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.

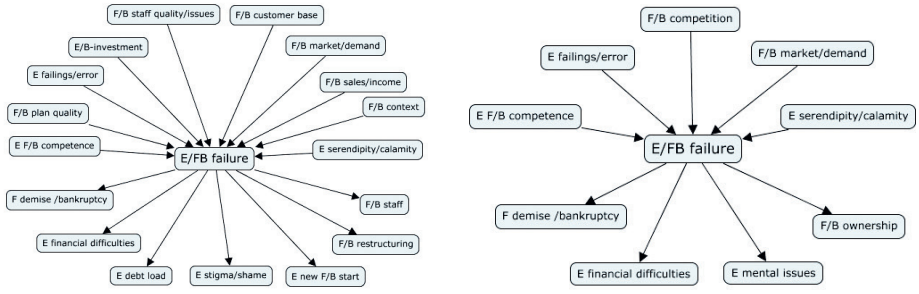
Overall, the focal maps indicate a higher complexity of the EI-pos group. In terms of E/FB success and E/FB failure, the two groups' attribution patterns are partly similar but different in some important respects. As reasons for E/FB failure, HEI students typically refer to the entrepreneur or some 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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