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# Supervisors and teachers' influence on expectations on empowering leadership among students in vocational education and training

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## Abstract

**Background:** Empowering leadership practise among leaders in the construction industry contributes to improve occupational safety, by stimulating participative safety behaviour among construction workers. Socialization into working life in the construction industry begins during vocational education and training (VET). It is therefore important to understand how VET influence young people's expectations on empowering leadership, i.e. their implicit leadership theories (ILT). The aim of the present study was to assess if empowering ILT of students change during VET, and if students' empowering ILT are influenced by the empowering leadership practice of teachers and workplace supervisors that the students interact with during VET.

**Methods:** Questionnaire data were gathered from students ( $n = 1907$ ) at seven construction VET-schools in Sweden and Denmark at two occasions, 1 year apart. Accelerated longitudinal design was employed and data were analysed using mixed method growth curve modelling.

**Results:** The empowering ILT of the VET-students was found to increase during VET. The leadership of supervisors', but not of teachers', was found to be positively related to the empowering ILT of the VET-students.

**Conclusions:** VET-students, in the beginning of their professional life, appear to alter their beliefs and assumptions about the characteristics of effective leaders. The ILT of VET-students may thus be regarded as dynamic and responsive, inclined to change as the students socialize into working life.

**Keywords:** Implicit leadership theory, Empowering leadership, Safety leadership, Construction industry, VET, Socialization, Occupational safety

## Background

### Empowering leadership and occupational safety

Globally, the number of fatal occupational accidents in 2003 were estimated to 360,000 (Hämäläinen et al. 2009). The construction industry is one of the worst affected occupational sectors; among European construction workers 4.8% reported one or more accidental injuries in 2007 (Eurostat 2010). Traditionally, occupational safety has been managed through physical barriers and implementation of rules and regulations

(Hudson 2007). However, a high level of safety is not only dependent on safety compliant behaviours, but also on participative behaviours, where employees take own initiatives to identify hazards, and improve workplace safety (Neal and Griffin 2006). Safety leadership research indicates the central role of managers and the quality of leadership for the development of participative safety behaviours of employees (Clarke 2013). Empowering leadership is a type of leadership practice that has been found to develop participative safety behaviours among employees (Grill et al. 2015; Shannon et al. 1997; Törner and Pousette 2009). Empowering leadership involves contributing to the psychological empowerment of employees by fostering opportunities for employees to participate in decision-making (Thomas and Velthouse 1990). Psychologically empowered individuals wish and feel able to shape their work role, context and performance (Conger and Kanungo 1988; Spreitzer 1995). Empowering leadership may be defined as “implementing conditions that increase employees’ feelings of self-efficacy and control (e.g., participative decision-making), and removing conditions that foster a sense of powerlessness” (Arnold et al. 2000, p. 250). Empowering leadership can be distinguished from other leadership practices as it involves a shift in the source of control from managers to employees, by encouraging participation in decision-making processes (Arnold et al. 2000). Extensive research on empowering leadership describe how such leadership can increase employees’ commitment (Hassan et al. 2013), motivation and innovation (Spreitzer 1995; Zhang and Bartol 2010), organizational loyalty (Keller and Dansereaul 1995), team learning (Burke et al. 2006), team performance (Seibert et al. 2011; Srivastava et al. 2006), as well as occupational safety (Grill et al. 2015; Shannon et al. 1997; Törner and Pousette 2009).

### **The reciprocal process of constructing empowering leadership**

How empowering leadership can be fostered and developed is a concern for practitioners and researchers alike (Labianca et al. 2000; Seibert et al. 2004; Spreitzer 2008; Yukl and Becker 2006; Zhang and Bartol 2010). To understand the complexity of this challenge, the relational and reciprocal character of leadership practice needs to be acknowledged. Effective leadership is inherently relational, performed by managers in close interaction with their employees, and managers are influenced by employees’ responses to their leadership (Avolio 2007; Bligh 2011; Gerstner and Day 1997). Thus, both managers and employees contribute to the construction of leadership, and ultimately, to leader effectiveness (Ehrhart 2012; Keller 2003).

Lord and colleagues (Lord et al. 1999; Shondrick et al. 2010), describe leadership as a result of group processes where leadership behaviours are negotiated between managers and employees: “Leadership results from a dynamic and reciprocal interaction between subordinates and superiors that involves leader behaviours, subordinate perceptions, and resulting outcomes” (Lord et al. 1999, p. 197). In this reciprocal interaction, managers and employees’ attitudes towards, theories about, and expectations on leadership, appear to play a crucial role for the realization of leadership practice (Lord et al. 1999). Also in the construction of empowering leadership, these reciprocal interactions are essential (Fausing et al. 2015; Grill et al. 2015; Keller and Dansereaul 1995; Labianca et al. 2000).

### **Reproducing empowering leadership during vocational education and training**

The collective reciprocal process of leadership construction is part of a vocational socialization process (Buchanan 1974; Nonaka et al. 2006). Socialization begins when an individual starts to associate him- or herself with a new working group, an organisation, or work in an industrial sector. The newcomers are subjected to, and gradually internalize, salient social norms, values and customs (Allen and Meyer 1990).

Work, as a potent source of influence on individuals' personalities and values (Heath 1977), may have its most significant socialization effect on a person during the preparation for and initial period of work (Frese 1982). Frese describes socialization as the transmission of systems of norms and social ideas, potent enough to affect individuals' schemas, i.e. the cognitive categorisations of concepts that comprises individuals' understanding of, and knowledge about, the concepts (Frese 1982). Individuals' schemas on leadership are commonly referred to as implicit leadership theories (ILT), and defined as "beliefs and assumptions about the characteristics of effective leaders" (Yukl 2013, p. 233). Lord et al. (1984) describe ILT as building stones that construct an individual's mental schema of leadership, i.e. a cognitive category containing information on what a leader is in terms of traits, abilities and behaviours. The ILT of empowering leadership, or empowering ILT, is the implicit theory that empowering behaviours is a characteristic of effective leaders (cf. Yukl 2013). Social cognitive research has demonstrated how schemas and implicit theories significantly influence judgements, choices, and behaviours (Ayman and Chemers 1983; Engle and Lord 1997; Fiske and Taylor 2013; Greenwald et al. 2009; Hunt et al. 1990; Lord et al. 2001; Nye and Forsyth 1991; Porr and Fields 2006; Rush and Russell 1988; Ajzen 1991).

The socialization into working life in an industrial sector normally begins with industrial specific vocational education and training (VET) (Schaap et al. 2012). During VET, young individuals socialize into professional life by receiving education and training to become working members of a professional community. VET can be understood as a socialization process into working life in general, and into work in a specific industrial sector in particular. During construction industry VET, young individuals socialize into working life in the construction industry, and an essential aspect of this socialization is the transmission of implicit knowledge and understandings (Schaap et al. 2012).

### **The possible dynamic nature of ILT**

Some ILT are universal and others display notable differences between cultures (Den Hartog et al. 1999; Gerstner and Day 1994; House et al. 2004). Still, the how and when ILT develop is a research area left largely unattended (Foti et al. 2014). Whether ILT are developed during early childhood and stable thereafter, or responsive and dynamic, continuing to develop as individual proceeds into adulthood, is still an unanswered question since only few attempts have been made to assess this. Epitropaki and Martin's (2004) longitudinal study, assessing changes in ILT in an adult population, concluded that ILT are stable mental structures that persist over time and resist change. This conclusion is in line with the general understanding in schema research, that once schemas are formed and established, they tend to endure and be resistant to change, even when disconfirming information is presented (Fiske and Taylor 2013). On the other hand, Dorfman et al. (2004) as well as Shondrick et al. (2010) suggest that ILT develop over time as part of

normal societal and organizational socialization processes. Empirical research exploring the origin of ILT argues for the significance of childhood and the interaction with the parents, our first leaders, as an important source for the development of individuals' ILT (Keller 2000, 2003; Popper and Amit 2009; Popper et al. 2000).

Individuals who undergo VET commonly do so during late adolescence or early adulthood. To what extent ILT are stable and resistant to change or dynamic and responsive, in adolescence and young adults during VET is unknown. Epitropaki and Martin (2004) call for further research on what happens with individuals' ILT as they first encounter working life, suggesting that socialization into working life may be critical for the development of individuals' ILT. The first aim of the present study was therefore to investigate if the empowering ILT of construction industry VET-students change during the socialization process of becoming a working member of the construction industry, a process that takes place during their time in VET.

**Hypothesis 1** The empowering ILT of students changes during VET.

#### **The influence of supervisors and teachers on the ILT of students'**

Rush and Russell (1988) suggest that ILT may be formed and altered when individuals perceive and/or interact with leaders. During VET, young individuals interact extensively with leaders other than their parents. Research on socialization (Allen and Meyer 1990) and social cognition (Bandura and McDonald 1963) suggests that the formation of attitudes and values in young individuals can be strongly affected by such role models. Hence, leaders that the students interact with during VET may potentially be an important source of influence on students' ILT.

VET consists of two separate learning contexts: schools and training companies (Schaap et al. 2012). This divide or boundary (Akkerman and Bakker 2011) constitutes two parallel learning arenas in which VET-students encounter two different types of leaders: teachers at the schools and supervisors at the training companies. Brockman and Laurie (2016) describe how students enrolled in vocational education develop an understanding of themselves as "academic learners" or as "practical learners". The knowledge and understandings of both types of learners were found to be primarily influenced by the practical, vocational aspects of the education, characterised by workplace learning. This indicates that supervisors at the workplace may be the prime role model when it comes to possible changes in the ILT of VET-students. This concord with studies that have identified supervisors at the training companies as a prime source of influence for young individuals learning a trade (Fjellström 2014; Gherardi and Nicolini 2002).

However, the "academic learners" in Brockmann and Laurie's study (2016) also embraced the theoretical parts of the education. This indicates that also teachers may be role models when it comes to possible changes in the ILT of VET-students. In order to further develop VET there is thus a need for studies that elucidate the possible influence of these two types of role models on the ILT of VET-students.

As described by Ford and colleagues (Ford et al. 2014), causal relations can be either *synchronous* or *lagged*. Research on social cognition (Fiske and Taylor 2013), suggests that individuals readily categorize themselves as part of a group and that this goal of belonging instantaneously affects people's interpretation of social stimuli. During VET, students may experience contrasts between their ILT and the behaviours of the leaders

they encounter, and may instantly adjust their ILT according to this new stimulus. Such processes of change suggest that any influence of supervisors and teachers on the ILT of VET-students, would be instantaneous/synchronous. On the other hand, schemas are commonly understood to be stable and resistant to change (Fiske and Taylor 2013). Understanding ILT to be more stable over time suggests that changes would be frictional and that hence any effects of supervisors and teachers' leadership on the ILT of VET-students would be delayed/lagged. In order to investigate these relations, the following hypotheses were formulated.

**Hypothesis 2a** Supervisors' empowering leadership has synchronous influence on students' empowering ILT.

**Hypothesis 2b** Supervisors' empowering leadership has lagged influence on students' empowering ILT.

**Hypothesis 3a** Teachers' empowering leadership has synchronous influence on students' empowering ILT.

**Hypothesis 3b** Teachers' empowering leadership has lagged influence on students' empowering ILT.

## Methods

### Respondents

Seven construction VET schools were strategically selected to provide variation regarding school size and location in major and minor communities. Since ILT may vary depending on cultural context (House et al. 2004), both Swedish ( $n = 4$ ) and Danish ( $n = 3$ ) schools were included, representing two similar countries with divergent VET-systems (Grytnes et al. 2017). The inclusion of both Swedish and Danish VET-students allowed for the assessment of the hypothesised dynamic nature of ILT in two different cultural contexts. All students attending the schools February–June 2014 ( $T_1$ ) and February–June 2015 ( $T_2$ ) were invited to participate in the study; the response rate was 80% at  $T_1$  and 83% at  $T_2$ . Swedish construction VET is divided into three grades, each of 1-year duration. Danish construction VET comprises up to 4 years. A questionnaire study with accelerated longitudinal design (Duncan et al. 2006) was employed to assess changes in empowering ILT over the whole VET-period using two measure points, one year apart. One year is equivalent to the time lag used in the study by Epitropaki and Martin (2004).

As shown in Table 1, the Swedish respondents ( $n = 643$ ; aged  $m = 18.3$  years,  $SD = 1.4$ ; 94% male) belonged to four cohorts, defined by how far into VET they had reached. Since the first cohort had not yet started school at  $T_1$ , they were only represented at  $T_2$ . The second cohort attended first year at  $T_1$  and second year at  $T_2$ . The third cohort attended second year at  $T_1$  and third year at  $T_2$ . The fourth cohort is only represented at  $T_1$  as they had finished school at  $T_2$ . The Danish respondents ( $n = 1264$ ; aged  $m = 22.8$  years,  $SD = 3.5$ ; 93% male) belonged to five cohorts. Since the first cohort had not yet started school at  $T_1$ , they were only represented at  $T_2$ . The second cohort attended first year at  $T_1$  and second year at  $T_2$ . The third cohort attended second year at  $T_1$  and third year at  $T_2$ . The fourth cohort attended third year at  $T_1$  and fourth year at  $T_2$ . The fifth cohort is only represented at  $T_1$  as they had finished school at  $T_2$ .

**Table 1 Graphical representation of the accelerated time variable**

Swedish VET-students				Danish VET-students				
	First year	Second year	Third year		First year	Second year	Third year	Fourth year
Cohort one (n = 194)	T <sub>2</sub>			Cohort one (n = 286)	T <sub>2</sub>			
Cohort two (n = 143)	T <sub>1</sub>	T <sub>2</sub>		Cohort two (n = 396)	T <sub>1</sub>	T <sub>2</sub>		
Cohort three (n = 149)		T <sub>1</sub>	T <sub>2</sub>	Cohort three (n = 303)		T <sub>1</sub>	T <sub>2</sub>	
Cohort four (n = 157)			T <sub>1</sub>	Cohort four (n = 207)			T <sub>1</sub>	T <sub>2</sub>
				Cohort five (n = 72)				T <sub>1</sub>

T<sub>1</sub> = 2014, T<sub>2</sub> = 2015

**Measures**

Implicit leadership theories may reliably be measured using explicit questionnaire items (Hofmann et al. 2005; Wittenbrink et al. 1997). To measure the empowering ILT of the VET-students, the participative decision-making subscale in Arnold et al. (2000) Empowering Leadership Questionnaire (ELQ) was adapted. Only one subscale of the ELQ was used, based on the results from the confirmatory factor analyses in Arnold et al. (2000), which suggest that five-factor models only marginally improves fit to data compared to one-factor models. The participative decision-making subscale was selected, as influence on decision-making may be considered fundamental for empowering leadership practice (Arnold et al. 2000). In addition, this ELQ subscale displayed almost complete overlap with two of the other four subscales in ELQ; factor inter-correlation with coaching was  $r = 0.91$ , and with showing concern,  $r = 0.91$ .

The adaptation and reformulation of the ELQ-items was informed by the formulation of the ILT-items in the global leadership and organizational behaviour effectiveness project (House et al. 2004). The following three items were used to measure students empowering ILT: (1) “An effective leader encourages team members to express ideas and suggestions”; (2) “An effective leader uses team members’ suggestions to make decisions”; and (3) “An effective leader considers team members’ ideas, even when he/she disagrees with them”. Each item was rated on a six-point Likert-type scale, ranging from completely disagree (1) to completely agree (6). To provide composite scale scores average scores were calculated with each item assigned equal weight (Cronbach’s  $\alpha = 0.80$ ).

The empowering leadership of school teachers and supervisors at the training companies were measured with two single items on students’ experience of each source of leadership. Leaders’ listening behaviours is a prerequisite for participative decision-making and a core aspect of empowering leadership (Green 2016; Deter and Burris 2007). Hence, items focusing explicitly on teachers and supervisors’ listening behaviours were formulated to measure students’ experience of teachers and supervisors’ empowering leadership: “My teachers at school are keen to listen to suggestions and ideas from us students on how work can be improved” and “My supervisors at the training

company are keen to listen to suggestions and ideas from us students on how work can be improved". Both items were rated on a frequency scale, from always (1) to never (7). The independent variables were reversely rated to reduce any common method variance (Lindell and Whitney 2001).

#### **Data analysis to assess changes in the empowering ILT of the VET-students**

In accordance with Hertzog and Nesselroade (2003), change was evaluated by employing mixed method growth curve modelling and comparing models with and without fixed and random effects of time. Data were analysed in SPSS version 20. The time variable, time in VET, was computed in accordance with accelerated longitudinal design (Duncan et al. 2006; Table 1). Any changes in the empowering ILT of the students were assumed to be linear. Time was centred at first year of VET.

To assess if the empowering ILT of the students changed, the log likelihood of empty models and models with fixed effects of time were compared. Models were estimated using maximum likelihood (ML), and compared on AIC-values and  $\chi^2$ -tests of the differences in log likelihoods. The fixed effects of time were also estimated with Wald-tests.

To assess if there was any significant difference between individual students in how their empowering ILT changed during VET, random effects of time were introduced to the growth curve models to see if this significantly decreased the log likelihood of the models. Models were estimated using restricted maximum log likelihood (REML), and compared on AIC-values and  $\chi^2$ -tests of the differences in log likelihoods.

#### **Data analysis to assess predictors for the empowering ILT of the VET-students**

The students' experiences of supervisors and teachers' empowering leadership were measured at T<sub>1</sub> and the students' empowering ILT was measured at T<sub>1</sub> and T<sub>2</sub>. Instantaneous/synchronous and delayed/lagged influences/effects of each source of leadership on the students' ILT were assessed by employing growth curve modelling and comparing empty models with models that included the students' experiences of each source of leadership as predictors of the students' ILT. In accordance with Ford et al. (2014), single main effects of leadership were estimated to assess the synchronous effects, and interaction effects between leadership and time were estimated to assess the lagged effects. Both predictors were grand mean centred prior to analyses. Models were estimated using maximum log likelihood (ML), and compared on AIC-values and  $\chi^2$ -tests of the differences in log likelihoods. The fixed effect of time was also estimated with a Wald-test. Only respondents who answered the questionnaire at both measurement points were included in this analysis. To obtain sufficient statistical power for these analyses, respondents from both countries were combined into a single dataset. Possible confounders included in the analyses were gender and country.

## **Results**

### **Changes in the empowering ILT of the VET-students**

Considering hypothesis 1, Tables 2 and 3 provide parameter estimates and standard errors for growth curve models in which individuals' empowering ILT were predicted by 'time' (years) in Swedish and Danish VET respectively. The results are presented in stepwise tests of models with increasing numbers of estimated parameters, starting with

**Table 2 Growth curve models in which empowering ILT is predicted by time in Swedish VET**

	Empty model		Model 1		Model 2	
	Par.	S.E.	Par.	S.E.	Par.	S.E.
Fixed effects						
Intercept	5.091**	0.025	5.031**	0.035	5.037**	0.035
Time			0.063**	0.026	0.065**	0.027
Random effects						
Residuals	0.271	0.024	0.263	0.023	0.198	0.028
Intercept	0.202	0.030	0.209	0.030	0.284	0.050
Time					0.130	0.041
Intercept*time					-0.117	0.042
Model specifics						
Estimation method	ML		ML/REML		REML	
Log likelihood	1891.3		1885.4/1896.5		1886.5	
AIC	1897.3		1893.4/1900.5		1894.5	
Diff log likelihood (diff df)			5.9* (1)		10.0** (2)	

n = 643. Wald tests for fixed effects and  $\chi^2$ -tests of diff log likelihood for random effects

\* p < 0.05

\*\* p < 0.01

**Table 3 Growth curve models in which empowering ILT is predicted by time in Danish VET**

	Empty model		Model 1		Model 2	
	Par.	S.E.	Par.	S.E.	Par.	S.E.
Fixed effects						
Intercept	4.848**	0.021	4.790**	0.030	4.787**	0.031
Time			0.055**	0.020	0.057**	0.020
Random effects						
Residuals	0.462	0.047	0.457	0.047	0.434	0.047
Intercept	0.159	0.046	0.160	0.047	0.252	0.047
Time					0.015	0.025
Intercept * Time					-0.047	0.034
Model specifics						
Estimation method	ML		ML/REML		REML	
Log likelihood	3346.3		3339.1/3350.9		3344.1	
AIC	3352.3		3347.1/3354.9		3352.1	
Diff log likelihood (diff df)			7.2**(1)		6.8*(2)	

n = 1264. Wald tests for fixed effects and  $\chi^2$ -tests of diff log likelihood for random effects

\* p < 0.05

\*\* p < 0.01

empty models. The level of students' empowering ILT varied between individuals, as indicated by ICC<sub>1</sub>-values of 0.43 (Sweden) and 0.26 (Denmark).

In Model 1, fixed effects of time were introduced. The empowering ILT of the VET-students were found to increase as an effect of time in VET, as indicated by significantly lower log likelihoods and significant positive parameter estimates, in both samples. In Model 2, random effects of time were introduced. The increase in the empowering ILT of the VET-students was found to display a significant individual variation, as indicated



**Table 4 Growth curve models in which ILT is predicted by time in VET, supervisors' leadership, and teachers' leadership**

	Empty model		Model 1		Model 2		Model 3		Model 4	
	Par.	S.E.	Par.	S.E.	Par.	S.E.	Par.	S.E.	Par.	S.E.
Fixed effects										
Intercept	4.963 **	0.025	5.076	0.033	5.040**	0.035	5.033**	0.035	5.033**	0.035
Country			-0.254**	0.050	-0.248**	0.050	-0.227**	0.050	-0.226**	0.051
Time					0.139**	0.044	0.139**	0.044	0.140**	0.044
Supervisor leadership							0.058**	0.017	0.058**	0.018
Supervisor leadership * time							-0.027	0.030	-0.033	0.031
Teacher leadership									0.002	0.017
Teacher leadership * time									0.019	0.029
Random effects										
Residuals	0.326	0.030	0.329	0.030	0.320	0.029	0.321	0.030	0.319	0.030
Intercept	0.227	0.035	0.207	0.035	0.212	0.035	0.205	0.035	0.206	0.035
Model specifics										
Log likelihood	2213.1		2187.9		2178.2		2166.5		2167.1	
AIC	2219.1		2195.9		2188.2		2181.1		2181.1	
Diff log likelihood (diff df)			25.5**(1)		9.7**(1)		11.7**(2)		0.6(2)	

n = 744. Estimation method: maximum likelihood (ML). Wald tests for fixed effects and  $\chi^2$ -tests of diff log likelihood

\*\*p < 0.01

by significantly lower log likelihoods in both samples. Model 2 showed the best fit to data, as indicated by the lowest AIC and log likelihood values, and provide parameter estimates for the fixed effects of time (Sweden:  $p = 0.017$ , Denmark:  $p = 0.004$ ) as well as the random effects of intercept, time, and the co-variances between intercept and time. The students differed in the level of their empowering ILT when they began VET, as indicated by the random effect of intercept, in both samples. Students that started with a lower level of empowering ILT tended to have a steeper increase in ILT during VET and students that started with a higher level of empowering ILT tended to have less development in ILT, as indicated by the negative co-variances between intercept and time in both samples. Hypothesis 1 was thus supported.

#### **Predictors for the empowering ILT of the VET-students**

Table 4 provides parameter estimates and standard errors for growth curve models, in which the empowering ILT of the VET-students was predicted by 'time' (years) in VET, 'supervisors' leadership', and 'teachers' leadership'. The level of empowering ILT varied between individuals ( $ICC_1 = 0.41$ ). In model 1, 'country' was introduced as a possible confounder. The Swedish VET-students were found to have a higher level of empowering ILT compared to the Danish students, as indicated by a significant positive parameter estimate of the fixed effect of 'country'. In Model 2, 'time' in VET was introduced as a single main effect. The empowering ILT of the VET-students was found to increase as an effect of time spent in VET, as indicated by a significant positive parameter estimate of the fixed effect, confirming the results from the test of hypothesis 1.

In Model 3, 'supervisors' leadership' was introduced, both as a simple main effect, and as an interaction effect with time. Supervisors' leadership was found to predict students' empowering ILT, as indicated by a significant positive parameter estimate of the simple main effect. However, supervisors' leadership was found not to predict a lagged development in the empowering ILT of the VET-students, as indicated by the lack of any significant interaction effect between supervisors' leadership and time.

In Model 4, 'teachers' leadership' was introduced, both as a simple main effect, and as an interaction effect with time. Teachers' leadership was not found to predict students' empowering ILT, as indicated by the lack of any significant parameter estimates.

Model 3 showed the best fit to data and provide parameter estimates for the significant fixed effects of 'country' ( $p < 0.001$ ), 'time' in VET ( $p = 0.002$ ), and 'supervisors' leadership' ( $p = 0.001$ ).

The results thus indicated that supervisors' leadership had a synchronous, but no lagged, effect on the empowering ILT of the VET-students. Hence, hypothesis 2a was supported, and hypothesis 2b was rejected. Teachers' leadership had neither a synchronous nor a lagged effect on students' empowering ILT. Hence, both hypotheses 3a and hypothesis 3b were rejected.

#### **Discussion**

The results of this study indicate that during construction VET, the empowering ILT of students is dynamic and changeable. Empowering ILT was found not only to increase in a systematic and directional way; the development also contained significant individual variation. These results thus empirically support a dynamic nature of ILT: VET-students,

in the beginning of their professional life, appear to alter their beliefs and assumptions about the characteristics of effective leaders.

The co-variance between intercept and time in the growth curve models suggests that the students' leadership schemas converge during their time in VET. In the course of the common socialisation process into working life in the construction industry that the student undergo during VET, they seem to align their ILT with one another. This interpretation is in line with research in social cognition that describe how perceptions and cognitions typically are affected by the goal of belonging (Fiske and Taylor 2013), and consequently that individuals' cognitive processes (Postmes et al. 2005) and attitudes (Kawakami et al. 2003) converge with those of other individuals within the same group.

Research on behavioural intentions by Ajzen (1991), provides a theoretical framework for understanding how the increase in empowering ILT among the VET-students found in the present study, may well have implications for leadership practices in the construction industry. VET-students, embarking on leadership positions and becoming supervisors, team leaders, and managers, can influence the leadership in the construction industry to become more participative by conveying their empowering ILT in manifest leadership behaviours (cf. attitude toward behaviour, in Ajzen 1991), as well as conforming to the empowering ILT of colleagues, superiors, and subordinates (cf. subjective norm, in Ajzen 1991). In addition, leadership is inherently relational, performed by managers in close interaction with their employees (Gerstner and Day 1997; Avolio 2007; Bligh 2011), VET-students, qua future construction workers, may consequently also influence leadership practice in the construction industry to become more participative, by expressing their expectations on the leadership of supervisors, team leaders, and managers (cf. subjective norm, in Ajzen 1991). During construction VET, the future construction managers and workers socialize into the leadership practices of the construction industry, and as they become working members of the industry they may well participate themselves in the reproduction of empowering leadership practice, by conveying their empowering ILT in manifest behaviours. Hence, the increase in the empowering ILT of the VET-students found in the present study, aligned with previous research on the processes behind leadership construction, suggests that the participative leadership culture in the construction industry (Grill et al. 2015) may be reproduced during construction VET.

The results indicated that the leadership of supervisors, but not of teachers', is positively related to the empowering ILT of the VET-students. This is in line with previous research underlining supervisors as central role models for students. The goal of belonging is a driving force in perception and mental representation (Fiske and Taylor 2013), and since VET is intended to prepare students for professional work and not for further studies, the students' goal of belonging may be more directed toward a future work context, where supervisors at the training companies are prime role models for leadership, than toward an educational context, where teachers at the schools are prime role models for leadership.

However, the study revealed no lagged effect of supervisors' leadership on students' ILT from one year to the next. Here it should be noted that the students often changed their training company during VET, with corresponding changes in supervisors. These changes may have obscured the influence over time of discrete supervisors, as changes

in training company were not accounted for in the study design. The results of this study thus provide a starting point for more fine-grained investigations of the influence of supervisors' leadership on the development in students' ILT during VET. It also raises research questions on how the teachers' role may be developed to further reinforce a positive influence of VET on the development of students' ILT. Answers to such questions may be of large practical importance to organizers of VET-programs.

The changes in the empowering ILT of the VET-students were found to be similar in Sweden and Denmark. However, country did emerge as a significant predictor for the level of empowering ILT. This finding indicates that empowering leadership may be more highly valued in the Swedish construction industry than in the Danish ditto. This result concord with previous research indicating that participative leadership is more prevalent in Sweden than in Denmark (Grill et al. 2015; Holmberg and Åkerblom 2007; Isaksson 2008; Schramm-Nielsen et al. 2004). The difference between countries in empowering ILT already at the start of VET, found in the present study, also indicates cultural differences in ILT, which develop also during childhood.

### **Limitations**

There is an abundance of cross-sectional leadership research aiming at addressing the subject of change (Hunter et al. 2007). Longitudinal research is generally called for. However, longitudinal study designs are both time and money consuming. The accelerated longitudinal design, employed in this study, demands less resource and demonstrates that long-term changes may be studied in shorter time periods. However, an accelerated design with only two measurement points assumes change to be linear. To test this assumption, more than the two measurement points available in this study, are necessary.

Using the same method to collect data on dependent and independent variables involves a risk that results may be influenced by common method bias. However, the results indicated that the influence of leadership on the ILT of the VET-students was attributable only to supervisors', and not to teachers' leadership. If the relation found were due to common method bias, similar relational patterns would have been expected for both categories.

Since the empirical base for this study was empowering ILT among adolescents and young adults in construction VET, the results should not hastily be generalized to other ILT, other periods in the life span of individuals, or to other industrial sectors. Replication of this study with an extended number of ILT is called for to assess how different ILT change in different contexts and in different age groups.

### **Conclusions**

By providing an example of a time bound change in empowering ILT, this study contributes to our understanding of implicit leadership theories. The findings support a theoretical standpoint suggesting that ILT may be regarded as dynamic and responsive mental structures, inclined to change if the psychosocial context of the individual changes sufficiently, at least still during early adulthood.

The empowering ILT of the VET-students were found to be more related to the students' experiences of the leadership behaviours of supervisors that they encounter at the

training companies, than the leadership they experience from teachers at the schools. Supervisors at the training companies seem to be important role models of leadership for VET-students. It may benefit VET-supervisors to be aware of, and appreciate their importance as such transmitters of leadership to young individuals learning the trade.

During construction VET, the future construction managers and workers socialize into the leadership practices of the construction industry, and as they become working members of the industry they may well participate themselves in the reproduction of empowering leadership practice, by conveying their empowering ILT in manifest behaviours.

#### Authors' contributions

All authors have contributed substantially in the design, data collection and writing of this publication. Data analyses were conducted by MG and AP. All authors read and approved the final manuscript.

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#### Competing interests

The authors declare that they have no competing interests.

#### Availability of data and materials

Data and materials described in the manuscript are available by contacting the main author of the article (martin.grill@amm.gu.se).

#### Consent to participate

All research subjects consented to participate in the research.

#### Consent for publication

All participants were given full anonymity; no data relating to individual participants are included in the paper.

#### Ethics approval

Ethics approval, number 547-14, was obtained from the Regional Ethics Committee in Gothenburg.

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