Innovativeness of Staff in Higher Education

Do Implicit Theories and Goal Orientations Matter?

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Abstract

Innovativeness has been believed to be a significant psychological construct underlying individual differences in adopting novel ideas, experiences or approaches. Although few recent studies have contributed to identifying the factors that predict innovativeness, there is a lack of research showing the impacts of implicit theories and goal orientations on innovativeness. This study aimed to investigate this matter. A sample comprising 315 staff members working in three Finnish higher educational institutions completed self-reported questionnaires. The results showed that the mastery goal orientation fully mediated the effect of both the entity theory of ability and personality on innovativeness. However, both entity theories failed to predict the performance-avoidance goal orientation, while the performance-avoidance goal orientation showed to be a significant, negative predictor of innovativeness. This study presents a promising framework for examining innovativeness in the higher educational context where further research is suggested.

Keywords: innovativeness, implicit theories, mindset, goal orientation, higher education, staff, structural equation modelling.

1. Introduction

A growing body of literature recognises the need to understand why individuals vary a great deal in their willingness to accept changes (Goldsmith & Foxall, 2003; Kirton, 1976; Loogma, Kruusvall, & Ümarik, 2012; Parzefall, Seeck, & Leppänen, 2008; Rogers, 2003). Recent endeavours of scholars in the educational field have shown the relevance of individual innovativeness in explaining these variances. Empirical evidence reveals that individual innovativeness predicts the usage of technology (Gökçearslan, Karademir, & Korucu, 2017; Jin, 2013), is associated with the awareness of Web 2.0 tools (Mutlu Bayraktar, 2012), influences the implementation of information and communication technology (ICT; Drent & Meelissen, 2008) and is related to perceived competencies in e-learning (Loogma et al., 2012) and techno-pedagogical skills (Çuhadar, Bülbül, & Ilgaz, 2013).

In the higher educational context, one may further argue that staff members should be responsive to change; it is not expected that administrations are interested in offering projects, initiatives, policies and new technologies for their staff which then face resistance and reluctance from the employees. The fact of the matter is that administrators at Higher Education Institutions (HEIs) are keen to provide an environment where employees' work is appreciated and respected; their opinion is involved in the decisions at higher levels; and where an optimal level of autonomy and discretion are offered (Heslin, 2010). Yet these efforts have not resulted in comprehensive understanding of the individual differences in the willingness to adopt changes (Hasanefendic, Birkholz, Horta, & Sijde, 2017). What is not clear in specific is to know what contributes to the individual innovativeness (Batra & Vohra, 2016). Midgley and Dowling (1978, p. 235) recognized that conceptualising innovativeness as a psychological construct is useful but they argued that it would be even better to see innovativeness as a function of other 'dimensions of the human personality'. This proposal opened up a research framework in which the researchers' way to understand innovativeness go through the other psychological characteristics. Several studies have identified a set of innovativeness' antecedents including cognitive style (Batra & Vohra, 2016), big five personality factors (Yesil & Sozbilir, 2013), positive relational experience, self-efficacy, psychological availability (Vinarski-Peretz, Binyamin, & Carmeli, 2011) and problem-solving style (Scott & Bruce, 1994). Among these efforts, only one study by Keong

& Hirst (2010) has attempted to establish a link between innovativeness and goal orientations. Even though, the goal orientations (Elliot and Murayama 2008; Midgley et al. 1998) and implicit theory (Dweck, 2006; Dweck & Leggett, 1988) were repeatedly reported in literature review studies (Anderson, Potočnik, & Zhou, 2014; Hero, Lindfors, & Taatila, 2017; Parzefall et al., 2008; Patterson, Kerrin, & Gatto-Roissard, 2009) as possible contributors to individual innovativeness. The present study meets this challenge and investigates the role of the implicit theory and goal orientation as predictors of innovativeness.

1.1 Innovativeness

Historically, individual innovativeness was addressed by tracking the observable behaviour of individuals to see, for example, if they have adopted or generated specific set of innovations (Goldsmith & Foxall, 2003). Such approach was mainly referred in the literature to as innovative work behaviour (Janssen, 2000), innovative job performance (Janssen & Van Yperen, 2004) or time-based innovativeness (Rogers, 2003). Considering some critical limitations of this approach (Goldsmith & Foxall, 2003), researchers adopted a deeper and more abstract definition of innovativeness, perceiving it as latent construct (Midgley and Dowling 1978) or underlying personality trait (Hurt, Joseph, & Cook, 1977) which shapes an individual disposition towards the newness regardless of the kind of innovation. It is worth noting that the literature, in the latter approach, has referred to innovativeness in different terms such as *life innovativeness* (Roehrich, 2004), *general innovativeness* (Menold, Jablokow, Purzer, Ferguson, & Ohland, 2014), *global trait innovativeness* (Goldsmith & Foxall, 2003) and *innate innovativeness* (Midgley and Dowling 1978). This conceptualisation is embedded in a well-respected research paradigm focusing on the personality trait which was meant to predict the persistent and enduring patterns of reacting positively towards innovations across all domains (Roehrich 2004; Goldsmith and Foxall 2003; Midgley and Dowling 1978).

Several theorists have studied general innovativeness from different perspectives (Hurt et al., 1977; Kirton, 1976; Leavitt & Walton, 1975). For example, Kirton (1976) distinguishes between adaptors and innovators in decision making and problem solving context. While adaptors seek to develop upon an existing structure, innovators seek to change the structure itself. Innovativeness is perceived here as a personal cognitive style which promotes changes and disruptions of the existing framework. Hurt, Joseph, and Cook (1977) define innovativeness as underlying personality trait which determines the individual willingness to change. Obviously, theorists present similar concepts of innovativeness and the convergent validity of their instruments revealed that they are measuring related but not identical constructs (Goldsmith, 1986). The current study adopts the conceptualisation and measurement of innovativeness as in the work of Hurt, Joseph, and Cook (1977).

1.2 Implicit Theories and Innovativeness

The implicit theory (Dweck, Chiu, & Hong, 1995) refers to an individual's beliefs about the nature of human attributes, including ability, personality and morality. Recent developments have heightened the need for revising the theory so that it refers to an individual's beliefs about the nature of one's own attributes rather than human attributes in general (De Castella & Byrne, 2015). People may hold two different theories (Dweck, 2006) – the incremental or the entity theory. Incremental theorists believe that human attributes are malleable, dynamic and improvable through effort and persistence. In contrast, entity theorists believe that human attributes are innate, fixed and unchangeable. A great deal of previous research has focused on implicit beliefs about ability, such as intelligence (Blackwell, Trzesniewski, & Dweck, 2007) and talent (Chełkowska-Zacharewicz & Kałmuk, 2016), while others have studied implicit beliefs about personality (Chiu, Hong, & Dweck, 1997). The findings on both attributes (ability and personality) support the assumption that the two are different yet related constructs (Dweck et al., 1995; Hughes, 2015; Spinath, Spinath, Riemann, & Angleitner, 2003).

A considerable amount of literature has demonstrated the role of implicit theories in predicting individual differences in a variety of human behaviours. Some examples are an interest in professional learning and development (Thadani, Breland, & Dewar, 2010, 2015), workplace learning (Meyer, 2012), work engagement (Heslin, 2010), managerial styles (Heslin, Latham, & VandeWalle, 2005), academic achievement (Komarraju & Nadler, 2013), self-handicapping in physical education (Ommundsen, 2001) and many others (Dweck, 2006).

While the implicit theory was initially developed in school, little has been done to investigate its impact in the higher educational context (Yorke & Knight, 2004). Among the limited number of studies on higher education, some target undergraduate students (Chen & Wong, 2015; Komarraju & Nadler, 2013; Robins & Pals, 2002), while others concentrate on the academic staff (Rissanen, Kuusisto, Hanhimäki, & Tirri, 2016; Thadani et al., 2015). However, the research to date has tended to focus on academics' implicit beliefs about their students' learning (Yorke & Knight, 2004) or about their teaching capabilities (Thadani et al., 2010) rather than their own abilities and personalities.

Several theoretical contributions suggest that it might be logical to link implicit theories to innovativeness (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009). Molden and Dweck (2006) contend that entity theories are associated with maladaptive psychological processes, while incremental theories are related to adaptive psychological processes such as self-regulation, social perception and social development. Based on this argument, we expect implicit theories to predict individual innovativeness, as follows:

Hypothesis 1. Entity theories are negatively related to individual innovativeness.

1.3 Goal Orientations and Innovativeness

Goal orientations refer to the purposes that individuals pursue while engaging in a task (Dweck & Leggett, 1988; Linnenbrink & Pintrich, 2002). In their early investigations of goal orientations, researchers have distinguished between two dimensions of goals: (1) mastery, learning or task goals and (2) performance or ego goals (Linnenbrink & Pintrich, 2002). Mastery goals orient individuals to engage in a task in order to learn, master new skills and improve their competencies, whereas performance goals orient individuals to engage in a task in order to surpass others, receive recognition for their performance and prove their competence (Dweck & Grant, 2008). Recent developments in the theory have led to partitioning performance goals into performance-approach and performance-avoidance goals (Middleton & Midgley, 1997; Midgley et al., 1998). Individuals pursuing performance-approach goals tend to focus on showing their competence to others, whereas individuals pursuing performance-avoidance goals tend to avoid appearing incompetent in comparison to others (Elliot & Church, 1997).

Over decades, researchers have considered goal orientation an important factor in interpreting individual differences in achievement settings (Grant & Dweck, 2003; Linnenbrink & Pintrich, 2002). Evidence has decidedly shown that mastery goals are associated with adaptive behaviours (Dweck & Leggett, 1988; Pintrich, 2000), whereas performance-avoidance goals are related to maladaptive behaviours (Elliot & Church, 1997). In comparison, research on performance-approach goals has not yielded such consistent results; while some studies show positive consequences (De Castella & Byrne, 2015; Elliot & Church, 1997; Midgley, Kaplan, & Middleton, 2001), others report the opposite outcomes (Ames, 1992; Dweck & Grant, 2008; Dweck & Leggett, 1988).

The goal orientation theory has also been developed in school (Ames, 1992; Pintrich, 2000) and then extended to the higher educational context (Daumiller, Grassinger, Dickhäuser, & Dresel, 2016; Mattern, 2005). The major line of research on goals has focused on students' (Midgley et al., 1998, 2001) or teachers' goal orientations (Butler, 2007; Mascret, Elliot, & Cury, 2015), while other studies have concentrated on the classroom goal structure which investigating the effect of the school or classroom environment on students' goals (Ames, 1992; Shim, Cho, & Cassady, 2013). More recently, goal orientations have been extended to examine the staff's goals in the higher educational context (Daumiller et al., 2016; Han, Yin, & Wang, 2015; Kunst, van Woerkom, & Poell, 2017; Van Yperen & Janssen, 2002; Wosnitza, Helker, & Lohbeck, 2014; Yin, Han, & Lu, 2017). Specifically, some studies have investigated the influence of instructors' goal orientations on their participation in professional development activities (Kunst et al., 2017), teaching quality (Daumiller et al., 2016), teaching approaches (Han et al., 2015; Yin et al., 2017) and job satisfaction (Van Yperen & Janssen, 2002). The previous research findings agree that mastery goals are associated with desirable consequences, while performance-avoidance goals are linked to unfavourable outcomes.

A number of review studies have emphasised the role of goal orientation in individual innovativeness (Anderson et al., 2014; Parzefall et al., 2008; Patterson et al., 2009). Surprisingly, an in-depth empirical examination of the relationship has scarcely been conducted. One exception is the study by Keong and Hirst (2010), who report that mastery and performance-approach goals are positively associated with attitudes towards innovation adoption, while performance-avoidance goals are negatively related to such attitudes. Therefore, we expect goal orientation to predict individual innovativeness, as follows:

Hypothesis 2. The mastery goal orientation is positively related to individual innovativeness.

Hypothesis 3. The performance-approach goal orientation is positively related to individual innovativeness.

Hypothesis 4. The performance-avoidance goal orientation is negatively related to individual innovativeness.

1.4 The Mediating Role of Goal Orientation

Dweck and Leggett propose a model in which 'implicit theories predict social goals and social goals provide the framework for social behavior' (1988, p. 265). The relationship between implicit theory of ability and goal orientations has been thoroughly examined (De Castella & Byrne, 2015; Komarraju & Nadler, 2013). The previous research findings present consistent evidence that the incremental theory of ability predicts mastery goals, while

the entity theory of ability predicts performance-approach and performance-avoidance goals (Blackwell et al., 2007; Chen & Pajares, 2010; Dweck & Leggett, 1988; Robins & Pals, 2002). As far as we know, the relationship between implicit theory of personality and goal orientations has not been examined in previous studies but we assume based on previous contributions (Chiu et al., 1997; Plaks, Levy, & Dweck, 2009) that entity theory of personality may influence goal orientations in much similar manner as the entity theory of ability does. Accordingly, we assume the following hypotheses:

Hypothesis 5. Entity theories are negatively related to the mastery goal orientation.

Hypothesis 6. Entity theories are positively related to the performance-approach goal orientation.

Hypothesis 7. Entity theories are positively related to the performance-avoidance goal orientation.

The mediating role of goal orientations has also been confirmed between implicit theories and for example, attributions, affect, self-esteem (Robins & Pals, 2002), academic motivation, academic achievement (Chen & Pajares, 2010; Chen & Wong, 2015; Dupeyrat & Marin é 2005) and self-handicapping (Ommundsen, 2001).

As outlined, implicit theories may predict innovativeness directly (Hypothesis 1), goal orientations may predict innovativeness (Hypotheses 2, 3 and 4), and implicit theories may predict goal orientations (Hypotheses 5, 6 and 7). In view of all that has been mentioned so far, we propose that goal orientation mediates the relationship between an implicit theory and innovativeness (Hypothesis 8).

Hypothesis 8. Goal orientation mediates the relationship between the entity theories and individual innovativeness.

2. Method

2.1 Participants

Complete data were collected from 315 (170 female and 145 male) staff members working in three higher educational institutions in Tampere, Finland. The age range was 20 – 67 years old ($M = 46$, $SD = 11.259$) and the average job experience in higher education was 176 months (about 14.5 years) ($SD = 116.772$). The majority of the participants were academic staff members (70%, n = 222), while the rest (30%, n = 93) were administrative personnel. Their educational levels were distributed as follows: bachelor's degree (8%, n = 26), master's degree (41%, n = 129), doctorate/post-doctoral degree (14%, n = 45), professor/docent (18%, n = 55) and others (19%, n = 60).

2.2 Measures and Procedures

Research permits were approved by the concerned universities prior conducting the study. An online questionnaire was distributed among the staff members during the 2015–2016 academic year, using email invitations and the universities' intranet. Unless otherwise indicated, a 5-point Likert scale was used, ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach's α was calculated as an estimate of the internal consistency of the scales. The questionnaire was revised for applicability to the staff in the higher educational context, translated to the Finnish language and piloted before being published. The questionnaire consisted of demographic questions (seven items) and the following measures:

2.2.1 Innovativeness

A shortened version (13 items) of Hurt and colleagues' (1977) Innovativeness Scale was adopted to measure the staff members' orientations towards change (e.g., 'I enjoy trying new ideas'). Cronbach's α was .849.

2.2.2 Goal Orientations

A shortened version (10 items) of Midgley and colleagues' (2000) Achievement Goal Orientation (AGO) Scale was adapted to measure the staff members' goal orientations. The adaptation included replacing 'school' with 'work', for example. The AGO Scale consisted of three subscales: Mastery Orientation (three items, e.g., 'One of my goals in work is to learn as much as I can'), Performance-Approach Orientation (three items, e.g., 'One of my goals is to show others that work is easy for me') and Performance-Avoidance Orientation (four items, e.g., 'It's important to me that I don't look incapable of doing my work'). Cronbach's α values for Mastery Orientation, Performance-Approach Orientation and Performance-Avoidance Orientation were .758, .783 and .818, respectively.

2.2.3 Implicit Theories

Two domains of implicit theories were measured: ability and personality. The eight-item person measure developed by Levy et al. (1998) was used, and another eight-item ability measure was adapted in a similar manner. The items were re-worded to reflect the first-person belief about the nature of his or her own attributes rather than human

attributes in general (e.g., for incremental theories, 'I can significantly change my basic characteristics'; for entity theories, 'I can do things differently, but the important parts of who I am can't really be changed'). The items were measured on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The incremental items were reverse-scored such that larger scores reflected a relatively strong entity theory. The eight-items corresponding to each domain were summed and averaged to create personality and ability entity theory scales. The high reliabilities of the reverse-scored scales (α = .889 and α = .873 respectively) provide a support for a unipolar measurement instrument. It is worth noting that there are two basic assumptions regarding the dimensionality of the implicit theory. For one, the implicit theory is measured using bipolar measurement in which the incremental and entity theories are two independent dimensions (Dupeyrat & Mariné, 2005; Hong, Chiu, Dweck, Lin, & Wan, 1999; Lou, Masuda, & Li, 2017). For the other, the implicit theory is measured using unipolar measurement in which the incremental and entity theories are two extreme points on one continuous dimension (Blackwell et al., 2007; De Castella & Byrne, 2015; Hughes, 2015; Robins & Pals, 2002) .The present study adopts the latter approach to avoid the loss of prediction power associated with typologising variables (Cohen, 1983).

2.3 Analysis

Data screening, missing values analysis and differences tests were conducted using SPSS 22.0 statistical package. Structural equation modelling (SEM) was conducted to test the hypotheses using R Lavaan package (Rosseel, 2012). What makes R Lavaan suitable to our data analysis is that it supports some statistical tests for non-normal data such as robust Maximum Likelihood (MLM), which does not exist in other software such as AMOS (Arbuckle, 2013; Rosseel, 2012). Since the data violated the assumption of multivariate normality, MLM estimation with robust standard error and mean adjusted chi-square (Satorra & Bentler, 1994) were used.

To assess the model fit, we used well-established indices, such as CFI, TLI, RMSEA and SRMR, as well as the chi-square test statistics. According to Hu and Bentler (1999), values greater than .90 for the CFI and TLI indices, and values less than .06 for RMSEA and less than .08 for SRMR are typically considered acceptable. For the ratio of X^2 to df, values less than 3 represent adequate fit (Schreiber et al., 2006).

We followed Baron and Kenny's (1986) four steps for establishing mediation as indicated in the results section. Bootstrapping analysis (Preacher & Hayes, 2008) was used to assess the mediating effect of the goal orientation.

3. Results

3.1 Preliminary Analyses

Prior to analysis, missing values analysis was conducted. Case screening of a total of 342 collected responses were resulted in removing 27 cases. The case screening identified the participants who (1) left all the items of one or more dimensions blank, (2) were unengaged while responding (using standard deviation per case per dimension), and (3) provided outlier responses. The resulted sample consisted of 315 responses which still had very limited number of missing values per variable. The missing data was analysed by means of data imputation, replacing them by the mean for the continuous variables (e.g. age and experience) and by the median for the categorical variables (e.g. items of Likert scale). To ensure the sample homogeneity regarding innovativeness, a series of differences tests were conducted. An independent sample t-test showed that there is no significant difference in innovativeness regarding the gender (male and female) and the job type (academic and administrative). The results of a one-way ANOVA also indicated no significant difference in innovativeness regarding the educational levels of the staff (all p >.05).

The means, standard deviations and zero order correlations among the variables are presented in Table 1. Notably, innovativeness is positively related to the mastery goal but negatively related to the performance-avoidance goal and the entity theory of ability. The two dimensions of performance orientation (approach and avoidance) were positively and strongly correlated; the same held true for the correlation between the two dimensions of the implicit theory (ability and personality).

Table 1. Means, standard deviations and zero order correlations among the variables

Study variables	1	2	3	4	5	6
1. Innovativeness	1	.324**	-.028	-.189**	-.171**	-.209**
2. Mastery goal		1	.054	.086	-.148**	-.197**
3. Performance-approach goal			1	.667**	.066	.095
4. Performance-avoidance goal				1	.059	.052
5. Entity theory of ability					1	.663**
6. Entity theory of personality						1
M	3.74	3.95	2.21	2.65	3.74	3.64
SD	0.562	0.696	0.826	0.957	0.872	0.916
Scale	1 – 5	1 – 5	1 – 5	1 – 5	1 – 6	1 – 6
Number of items	13	3	3	4	8	8

$*p < .05$; $**p < .01$.

3.2 Direct Effect

3.2.1 Implicit Theories Predicting Innovativeness (Hypothesis 1)

First, we examined whether variations in the entity theory significantly accounted for variations in innovativeness. Because the implicit theories of ability and personality were significantly correlated ($r = .663$, $p < .01$), we built two separate models to isolate the variance explained by each dimension of the implicit theories (see Figure 1 and Figure 2). The results showed that the entity theory of ability ($\beta = -.219$, $p < .01$) and personality ($\beta = -.202$, $p < .01$) predicted innovativeness significantly and the models fit the data well; for entity theory of ability ($X^2 = 336.483$, $df = 184$, $p < .001$, $X^2/df = 1.828$, CFI = .922, TLI = .911, RMSEA = .056, SRMR = .057), and for entity theory of personality ($X^2 = 358.037$, $df = 183$, $p < .001$, $X^2/df = 1.956$, CFI = .921, TLI = .909, RMSEA = .059, SRMR = .059). According to Baron and Kenny (1986), the goal orientation may play a *fully* or *partially mediating role* between innovativeness and both the entity theory of ability and personality.
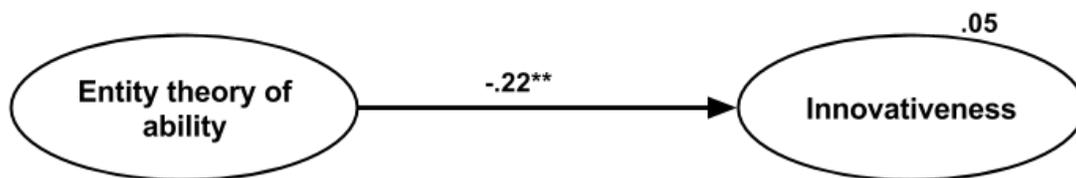

Figure 1. Entity theory of ability predicts innovativeness. Standardised regression coefficients reported. $**p < .01$.
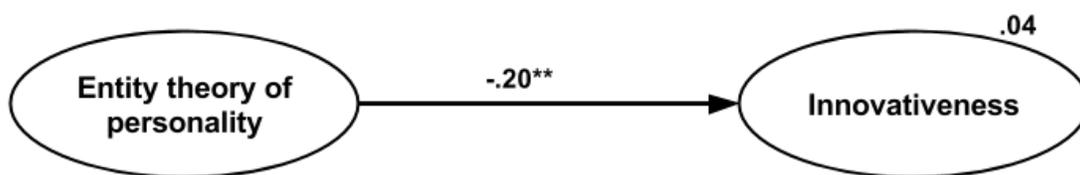

Figure 2. Entity theory of personality predicts innovativeness. Standardised regression coefficients reported. $**p < .01$.

3.2.2 Goal Orientations Predicting Innovativeness (Hypotheses 2, 3 and 4)

From the correlation matrix in Table 1, the performance-approach goal showed no significant correlation to any of the other variables. Therefore, it was excluded from the analysis. We examined whether variations in goal

orientations (mastery and performance-avoidance) significantly accounted for variations in innovativeness (see Figure 3). The model showed that both the mastery goal (β = .400, p < .001) and the performance-avoidance goal (β = -.233, p < .01) predicted innovativeness. The model acceptably fit the data (X^2 = 353.254, df = 204, p < .001, X^2/df = 1.732, CFI = .922, TLI = .911, RMSEA = .052, SRMR = .076).
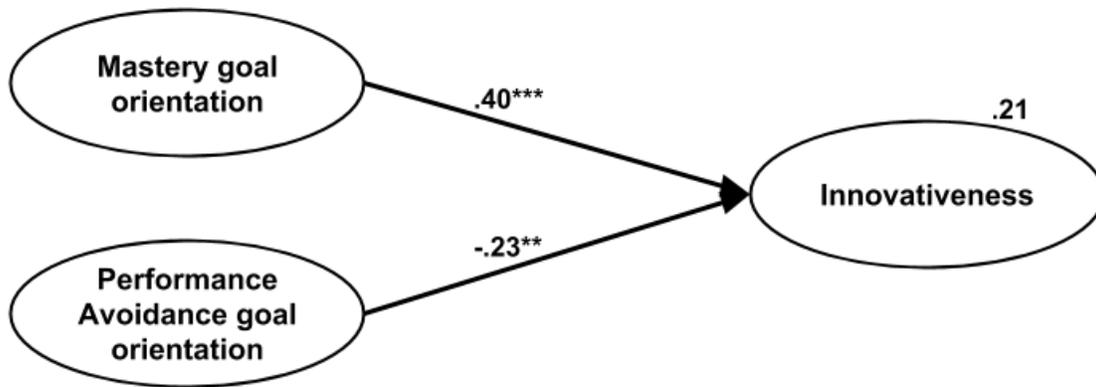

Figure 3. Goal orientations predict innovativeness. Standardised regression coefficients reported. **p < .01; ***p < .001.

3.2.3 Implicit Theories Predicting Goal Orientations (Hypotheses 5, 6 and 7)

Excluding the performance-avoidance goal because it failed to show a significant correlation to any of the implicit theories (see Table 1), we then examined whether variations in the entity theory significantly accounted for variations in only the mastery goal orientation (see Figure 4 and Figure 5). The results showed that the entity theory of ability predicted the mastery goal (β = -.207, p < .01) in the absence of the entity theory of personality, with a sufficient model fit (X^2 = 105.763, df = 41, p < .001, X^2/df = 2.579, CFI = .939, TLI = .918, RMSEA = .079, SRMR = .056), and the entity theory of personality predicted the mastery goal (β = -.231, p < .01) in the absence of the entity theory of ability, with a sufficient model fit as well (X^2 = 100.873, df = 42, p < .001, X^2/df = 1.714, CFI = .953, TLI = .939, RMSEA = .072, SRMR = .045).

Figure 4. Entity theory of ability predicts mastery goal orientation. Standardised regression coefficients reported. **p < .01.
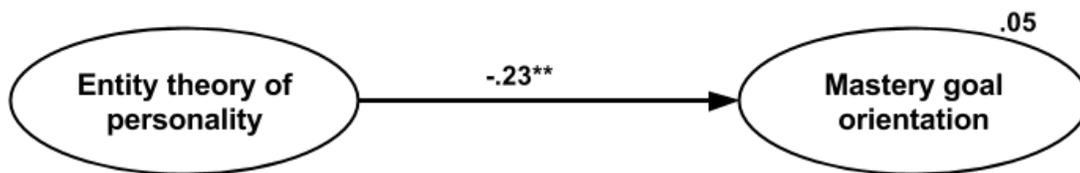

Figure 5. Entity theory of personality predicts mastery goal orientation. Standardised regression coefficients reported. **p < .01.

3.3 The Mediation Model (Hypothesis 8)

Following the fourth step of Baron and Kenny's (1986) mediation analysis, we tested the mediating role of goal orientations between implicit theories and innovativeness (Figure 6). Given the high correlation between the two dimensions of the entity theory, two models (M1 and M2) were analysed. M1 was dedicated to examining the mediating role of goal orientations between the entity theory of *ability* and innovativeness. The results revealed a non-significant direct effect of the entity theory of ability on innovativeness, thus indicating the full mediation effect of the mastery goal orientation. This mediation model showed a good data fit ($X^2 = 420.136$, $df = 243$, $p < .001$, X^2/df = 1.729, CFI = .921, TLI = .910, RMSEA = .052, SRMR = .061) and accounted for 16% of the variance in innovativeness.

M2 was dedicated to examining the mediating role of goal orientations between the entity theory of *personality* and innovativeness. Similar to the entity theory of ability, the effect of the entity theory of personality on innovativeness was shown to be full mediated by the mastery goal orientation. This model also provided an adequate data fit ($X^2 = 438.170$, $df = 244$, $p < .001$, $X^2/df = 1.796$, CFI = .921, TLI = .963, RMSEA = .054, SRMR = .061) and accounted for 16% of the variance in innovativeness.
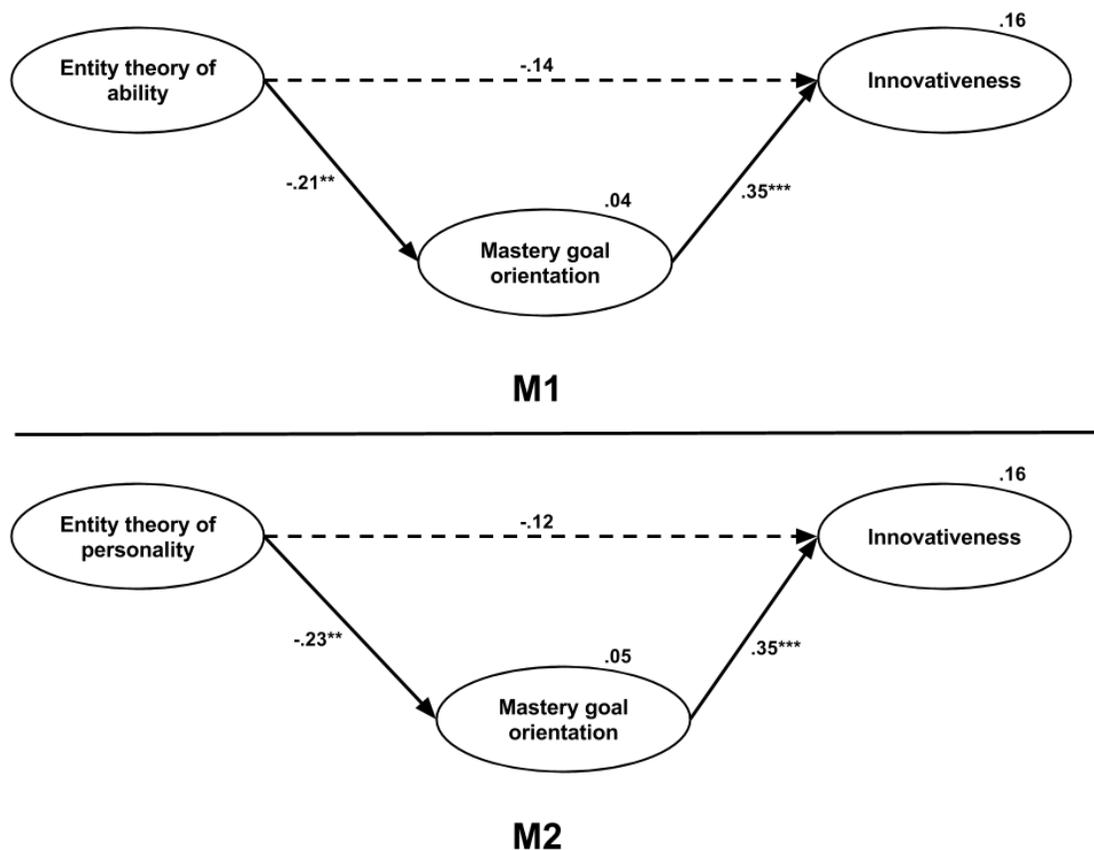

Figure 6. Mediation models – the mediating role of goal orientation between the entity theory of ability and innovativeness (M1) and the mediating role of goal orientation between the entity theory of personality and innovativeness (M2). Standardised regression coefficients reported. Punctured lines are non-significant. **$p < .01$; ***$p < .001$.

To assess the significance of mediation, we used a bootstrapping method with 5,000 bootstrap samples and 95% bias-corrected confidence intervals (CIs) (Preacher & Hayes, 2008). The results showed a significant full mediation in M1 ($\beta = -.074$, 95% CI [-.099, -.011], $p < .05$) and a significant full mediation in M2 as well ($\beta = -.082$, 95% CI [-.112, -.017], $p < .05$).

3.4 The Summary Model Predicting Innovativeness

Since this paper investigates the psychological factors predicting innovativeness, this subsection presents a summary model that includes all factors predicting innovativeness directly or indirectly. As reported in the previous subsections, the entity theories of ability and personality predicted innovativeness indirectly through the mastery goal. Additionally, the performance-avoidance goal predicted innovativeness directly. Controlling for the entity theory of personality, the summary model (M3 in Figure 7) included the entity theory of ability, the mastery goal and the performance-avoidance goal as predictors. The results showed that M3 fit the data well (X^2 = 549.231, df = 341, p < .001, X^2/df = 1.611, CFI = .922, TLI = .914, RMSEA = .047, SRMR = .065) and showed a *significant* full mediation (β = -.094, 95% CI [-.111, -.015], p < .05). The predictors in M3 accounted for 22% of the variance in innovativeness.
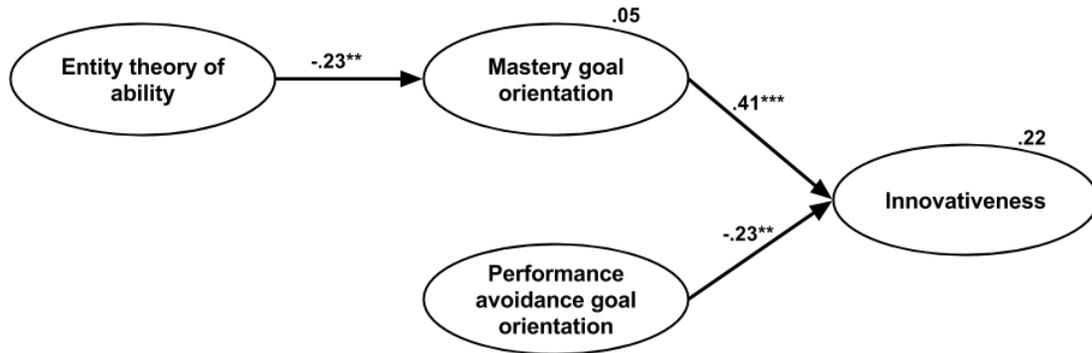

Figure 7. Summary model – the entity theory of ability and goal orientations as predictors of innovativeness (M3). Standardised regression coefficients reported. **p < .01; ***p < .001.

In contrast and controlling for the entity theory of ability, the summary model (M4 in Figure 8) included the entity theory of personality, the mastery goal and the performance-avoidance goal as predictors. The results showed that M4 fit the data well (X^2 = 559.280, df = 342, p < .001, X^2/df = 1.635, CFI = .925, TLI = .917, RMSEA = .048, SRMR = .066) and indicated a *significant* full mediation (β = -.100, 95% CI [-.130, -.021], p < .05). The predictors in M4 accounted for 22% of the variance in innovativeness.
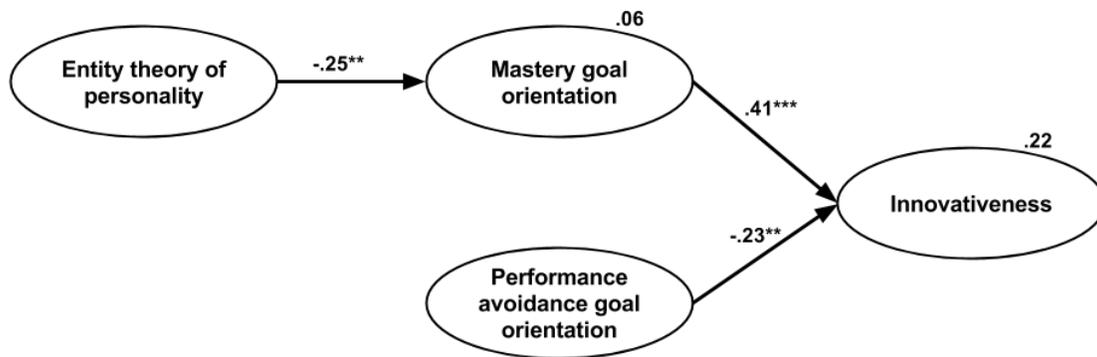

Figure 8. Summary model – the entity theory of personality and goal orientations as predictors of innovativeness (M4). Standardised regression coefficients reported. **p < .01; ***p < .001.

Thus, the current models M3 and M4 indicate that the influence of both implicit theories of ability and personality on innovativeness is fully mediated by mastery goal orientation and both models explain 22% of the variance.

4. Discussion and Conclusions

The current study expands the previous models and research on innovativeness by incorporating implicit theories and goal orientations as predictors of individual innovativeness. Moreover, it contributes to the literature about achievement settings (Grant & Dweck, 2003) by confirming its applicability to staff members in the higher educational context.

This study's results show a high correlation between the two dimensions of implicit theories: ability and personality. The results provide support to the findings of Dweck and colleagues (Dweck et al., 1995; Dweck & Grant, 2008), who argue that an individual's beliefs in one's ability and personality are correlated, but still distinct psychological constructs.

The analysis shows that both entity theories predict the mastery goal orientation but fail to predict the two performance orientations. These findings are in accord with the previous research indicating that the more individuals endorse the entity theory of their ability, the less likely they are to strive for the mastery goal (Blackwell et al., 2007; Chen & Wong, 2015; De Castella & Byrne, 2015; Dupeyrat & Mariné, 2005; Ommundsen, 2001; Robins & Pals, 2002). Contrary to our expectations, no significant correlation between the entity theories and the two performance orientations is found, which also challenges previous studies suggesting the entity theories' correlation with performance-avoidance (Chen & Pajares, 2010; De Castella & Byrne, 2015; Elliot & McGregor, 2001) and performance-approach goal orientations (Blackwell et al., 2007; Chen & Pajares, 2010; De Castella & Byrne, 2015). Nonetheless, the amount of the mastery goal's variances that is accounted for by the entity theory of ability and personality are fairly weak (R^2 less than .06). The findings confirm those obtained by Dupeyrat and Mariné (2005), who reported that the entity theory of ability explains only 10% of the mastery goal's variance. One explanation might be that the mastery goal orientation would be best predicted by other factors, such as organisational culture (Aldahdouh, Korhonen, & Nokelainen, 2017; Cameron & Quinn, 2006), growth-oriented atmosphere (Nokelainen & Ruohotie, 2009) and other epistemological beliefs (Schommer, Crouse, & Rhodes, 1992). Future research should take some of these factors into account to gain a better understanding of the staff members' differences in goal orientations.

The results confirm the association reported earlier between goal orientations and innovativeness (Keong & Hirst, 2010). As hypothesised, mastery and performance-avoidance goals are significant predictors of innovativeness, positively and negatively, respectively. In other words, mastery-oriented staff members who strive to explore new ideas and satisfy their learning curiosity tend to be innovators by trying new experiences, enjoying challenges and accepting risks. In contrast, performance-avoiding staff members who are driven by their fear of appearing incompetent or incapable of keeping pace with others are inclined to be late innovation adopters by avoiding the risk of uncertainty and resisting any changes to their regular work.

The present study does not support Keong and Hirst's (2010) findings that the performance-approach goal is positively correlated with attitudes towards innovation adoption. Thus, the present study's results can contribute to the long-standing debate about the consequences of the performance-approach goal (Butler, 2007; Mascret et al., 2015; Retelsdorf, Butler, Streblow, & Schiefele, 2010). The study, therefore, supports the line of research indicating that the performance-approach goal may lack the power to predict individual differences in different contexts (Butler, 2007; Chen & Pajares, 2010; Middleton & Midgley, 1997; Retelsdorf et al., 2010). The current findings may reveal the need for a decisive investigation of whether the performance approach should be considered or abandoned as a differentiating factor among staff members in higher education.

Our main findings support the hypothesis that the staff members' implicit theories of their ability and personality predict their innovativeness, and this association is fully mediated by the mastery goal orientation. The results suggest that staff members who view their ability and personality as a fixed quality tend to avert the mastery goal and are thus less oriented towards innovativeness. This result may corroborate the theoretical matching between the characteristics of entity theorists, as described by Dweck (2006), and late adopters, as described by Rogers (2003). Dweck (2006) argues that entity theorists who avoid challenges and focus on performance rather than learning are less likely to engage in achievement tasks, especially those that may expose their deficiency. Avoiding risks, averting uncertainty and thinking twice before accepting innovations are actually the core characteristics of late adopters (Rogers, 2003).

This study has significant and practical implications for understanding the important determinants of how staff members in higher education differ in their orientations towards change. The study provides strong evidence that implicit theories and associated goals have substantial effects on staff innovativeness. Signs of increasing adherence to the entity theories and performance-avoidance goal orientation should be taken as dangerous signals if present in innovative higher educational institutions. Fortunately, recent endeavours in the field have shown that implicit theories and associated goals can be altered in different ways (Blackwell et al., 2007; Heslin, 2010; Heslin et al., 2005; Keating & Heslin, 2015; Kunst et al., 2017; Meyer, 2012; Shim et al., 2013). The workplace culture has proven to be effective in modifying the espoused beliefs and goals of teachers, employees and managers (Murphy & Dweck, 2010). Cameron and Quinn (2006) argue that although an organisational culture is relatively stable, it can

still be changed with a well-thought-out plan. Alternatively, a relatively modest, quick and less expensive intervention involves introducing professional development programmes for staff members. Such programmes that present the concepts of implicit theories and goal orientations together with their consequences could result in appreciable changes in staff motivation and innovativeness (Dweck & Grant, 2008; Heslin, 2010; Heslin et al., 2005).

This study notes some limitations and considerations for future research. Its cross-sectional design limits the ability to confirm the causality relationships. Future research with a longitudinal design would prove our claims about the causality relationships. A second drawback of this study is that all constructs are measured by means of a self-reported questionnaire. Thus, the results are subject to the common-method bias. Future research may add other methods to the self-reported questionnaire. The study's third shortcoming is its adoption of the AGO questionnaire, which includes only three goal orientations. Recent developments in the field have revealed some additional goal orientations for teachers, such as mastery-avoidance (Elliot & McGregor, 2001), work-avoidance (Butler, 2007), task-approach, task-avoidance, self-approach and self-avoidance, other-approach and other-avoidance types (Mascret et al., 2015). It would be interesting to investigate the applicability to and the consequences of these recent dimensions for innovativeness. Finally, the study sample only includes staff members of higher educational institutions, which may limit the results' generalisability to other institutions. It is recommended that further research be undertaken in other institutions, such as schools, companies and governmental organisations. Notwithstanding these limitations, the present study provides a noteworthy model to understand staff innovativeness in higher education.

In summary, this study set out to examine the role of implicit theories and goal orientations in explaining staff's differences in innovativeness. The most obvious finding to emerge from this study was that the mastery goal orientation fully mediated the effect of both the entity theory of ability and personality on innovativeness. However, the performance-avoidance goal orientation had no precedents out of the implicit theories and had a direct negative effect on innovativeness. Moving forward, the field may be advanced by extending the current model to include the organisational factors along with other psychological factors. Our ultimate aim is to bring the holistic picture of the contributing factors of individual innovativeness.

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