

**Are organizational defensive routines harmful to the relationship between personality
and organizational learning?**

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1. Introduction

Academics and practitioners have long agreed that organisational learning contributes to organisational competitiveness. This important role for organisations has stimulated many attempts to define the meaning of organisational learning (Kim, 1993; Popova-Nowak & Cseh, 2015) and to identify the factors affecting organisational learning (Martínez-León & Martínez-García, 2011). Theorists often adopt a cognitive approach to explain how organisations can learn (Chadwick & Raver, 2012) through individuals, yet limited empirical studies have investigated how individual factors influence organisational learning. Simon (1991, p.125) generalised two mechanisms of how organizations learn – i.e. “(a) by the learning of its members or (b) by ingesting new members who have knowledge the organization didn't previously have”. Each one of the two creates collective learning that is grounded in individuals. Consequently, individuals play a decisive role in organisational learning, but very little empirical research has explored how individuals *affect* learning in organisations. This paper selected personality as a stepping stone to understand how individual differences can affect organisational learning, thereby contributing to the understanding of micro-foundations related to organisational learning.

Personality has been studied previously to understand its effect on learning. For example, Klein and Lee (2006) studied 157 students and concluded that learning goal orientation relates positively and significantly to conscientiousness and openness to experience. Knowledge sharing and knowledge acquisition, as components of organisational learning, can be influenced by individuals' personality traits (Matzler, Renzl, Mooradian, von Krogh, & Mueller, 2011). Hence, our assumption is that personality traits might have an

impact on organisational learning. Many organisations use psychometric tests (e.g., Big Five Dimensions) in personnel selection to identify the best candidates, but still fail to reach their expected learning outcomes (Francesca & Staats, 2015). We apply organisational defensive routines (hereafter ODRs) to explain this puzzle.

ODRs are defined as ‘actions or policies that prevent individuals or segments of the organization from experiencing embarrassment or threat’ (Argyris, 1990, p. 25). Argyris (1990) contends that organisational defensive routines exist in most organisations, and these routines can guide individuals to self-censor certain ideas automatically and subliminally. When employees in organisations routinely withhold ideas about important problems from their superiors, this can thwart organisational learning and hamper organisational change (Morrison et al., 2000). We expect that the level of ODRs can influence the relationship between personality traits and organisational learning.

This paper makes three contributions to the literature. First, we provide empirical evidence on the relation between personality traits and organisational learning. Second, we theoretically and empirically integrate ODRs into the model, thereby extending knowledge on a particular set of routines that is likely to be a barrier to organisational learning. Hence building on recent advances in research on routines (see special issue of *Organization Science*, 2016) we emphasise the importance of micro-foundations of organisational routines while simultaneously underscoring the dynamic nature and performative aspects of organisational routines. Third, the results are of relevance for researchers and practitioners alike as they strive to improve organisations’ learning capabilities.

2. Theoretical framework

2.1 Organisational learning

Learning is the key to organisational competitiveness (Dodgson, 1993); it is a

component of organisational absorptive capacity (Cohen & Levinthal, 1990; Kim, 1993); and it is a determinant of organisational performance (Jiménez-Jiménez & Sanz-Valle, 2011). Results of current studies leave very little doubt about the positive effects of learning on organisational survival (Jiménez-Jiménez & Sanz-Valle, 2011). Due to its importance, academics have been tackling organisational learning from various angles. Dodgson (1993) reviewed institutional learning in different industries and perspectives and showed that one of the research trends in the area attempts to understand its outcomes. For example, learning is considered to produce a positive outcome which enhances competitiveness. Another trend is to understand organisational learning from its procedural aspects (Dodgson, 1993). Yet others attempt to capture the factors contributing to institutionalised learning. For example, individuals' positive emotions, such as comfort and excitement, can benefit organisations by helping them exceed their learning expectations (Shipton & Shillince, 2012). Individuals' contributions to learning in organisations has also been analysed from the perspective of cognitive structure in Cohen and Levinthal's (1990) seminal work about absorptive capacity. Managers' cognitive limitations and limited ability to share knowledge impact negatively on absorptive capacity (Volberda et al., 2010).

Others describe absorptive capacity as the process by which knowledge is acquired, interpreted, disseminated and integrated in organisations (Huber, 1991). Because of the differences in philosophical stances (Easterby-Smith, Snell, & Gherardi, 1998), the understanding of organisational learning is still diverse and lacks consensus. This mystification of institutional learning creates a challenge when attempting to measure it. Arthur and Aiman-Smith (2001, p. 739) summarised this point very well when they stated that “operationally defining and measuring organizational learning in empirical research has proven to be excruciatingly hard to do.” Huber's concept of organisational learning is different from absorptive capacity as referred to by Cohen and Levinthal (1990). Absorptive

capacity emphasises the recognition, assimilation and exploitation of knowledge. Huber's model, however, considers prior related knowledge as part of the multi-faceted knowledge acquisition process. Huber (1991) also posited that organisational memory plays a crucial role to ensure that organisations retain the knowledge they hold. This aspect, however, has limited resonance with Cohen and Levinthal's concept of absorptive capacity.

Researchers also tried to identify how organisations learn from processes (e.g., Crossan et al., 1999; Huber, 1991). Although terminologies differ, the way the process is defined is similar (Pérez López, Manuel Montes Peón, & José Vazquez Ordás, 2005). In this paper, we adopt Huber's model with its four dimensions: *knowledge acquisition*, *knowledge distribution*, *knowledge interpretation* and *organizational memory*. The model maintains a broad view of learning that is capable of capturing the multifaceted characteristics and inter-linked processes across levels, and has been tested empirically (Jiménez-Jiménez & Sanz-Valle, 2011; Pérez López et al., 2005). The model has been selected because it provides a structure on which to understand organisational learning. In the following, we review these four elements of the model in an attempt to make them more relevant to recent developments in the literature.

For Huber, *knowledge acquisition* refers to the process where knowledge is absorbed from internal elements and external organisations. Knowledge that is gained internally could be from employees, founders' knowledge, and archival data. Individuals who have accumulated substantial prior knowledge could have higher absorptive capacity to acquire and assimilate new knowledge (Cohen & Levinthal, 1990). Knowledge gained externally is mainly derived from imitating competitors or by recruiting new members to organisations (Huber, 1991; Levitt & March, 1988). Mergers and acquisitions are examples of organisations that enhance or reduce opportunities for organisational learning on a large external scale. Exposure to external knowledge affords more opportunities to acquire new

knowledge, but unless the new knowledge is internalized and extensively practiced by employees, this condition is not sufficient on its own (Kim, 1993; Zahra & George, 2002). This is consistent with the more traditional views of cognition, where there is a neat distinction between internal and external resources (Simon, 1979). More recent views of learning, cognition and knowledge consider these clear-cut distinctions very difficult to use when explaining how knowledge works in practice (Clark, 2008). In fact, any distinction between internal and external knowledge forms is arbitrary and the knowledge acquisition process is more a cognitive exchange where internal and external resources ‘interplay’ (e.g., Clark & Chalmers, 1998). Huber’s ‘acquisition’ can be interpreted to include these more current aspects.

Knowledge distribution refers to the fact that knowledge usually spreads among members in the team and between departments (Huber, 1991) and it refers to tacit and explicit knowledge. These have been reviewed extensively in the literature (Matzler et al., 2011). Explicit knowledge is about rules and procedures that can be documented in organisations to guide employees’ behaviour. This kind of knowledge is easily replicated and distributed in organisations. However, according to the proponents of this approach, the majority of the organisations’ knowledge is ‘stored’ in individuals’ heads and it is tacit (Kim, 1993). It is challenging for organisations to access tacit knowledge because it is difficult to locate its source and to initiate knowledge sharing. This is because, in a very traditional view based on neoclassic economics, people who share knowledge could face the risk of losing their competitive advantage over other people (Borges, 2013). Instead, a more prosocial view of individual knowledge sharing can be based on a distributed or systemic view of cognition (e.g., Hutchins, 1995). Individuals in an organisation share ‘information’ because they treat each other and the external artifacts as external cognitive resources (Hutchins, 1995). This leads them to behave pro-socially when relying and benefitting from each other’s

information; in short, cooperation and altruistic behaviours are more likely to emerge (Secchi, 2011) provided the appropriate cognitive abilities develop (Hutchins, 2014).

Knowledge interpretation is about conferring meaning to knowledge and this depends on a series of factors that lie on the continuum between organisational and individual characteristics. An example of how interpretation of ideas, thinking, behaviour, practices, or processes occurs is given by studies of intra-organisational diffusion processes. These studies point out how organisational routines, culture, peer social identity, individual attitudes and cognition are particularly relevant for information interpretation to emerge (e.g., Fiol & O'Connor, 2003; Secchi & Gullekson, 2016). Intensity of social interaction between individuals and teams could improve understanding of new external knowledge (Jansen, Van Den Bosch, & Volberda, 2005).

Organizational memory refers to “stored information from an organization’s history that can be brought to bear on present decisions” (Walsh & Ungson, 1991, p. 61). It is a repository of organisational knowledge, and contains formal procedures, informational databases and shared mental models (Huber, 1991). It plays a decisive role in the process of organisational learning because what is learned has to be stored in organisational memory, and this makes learning resources available to the wider organisational community (Huber, 1991). According to this view, some organisational knowledge is stored explicitly in the form of rules and procedures; some is stored in members’ minds. Thus, organisational memory is a construct that embodies both individual and organisational levels (e.g., Hodgkinson & Healey, 2008). On the one hand, organisational memory is much more dynamic than originally thought (organisational memory is a repository of knowledge). On the other hand, it is an extremely adaptive process that cannot be detached from the process that triggers it (e.g., Neumann and Cowley, 2015).

2.2 Personality traits

Researchers have used individual learning processes to understand organisational learning (e.g., Crossan, Lane, & White, 1999) and individual learning is usually considered one of its components (Kim, 1993). Learning at the organisation level is a mixture of individual, group and organizational levels of learning. Individual learning is recommended as the first step of learning at the social level, through which alternative solutions to organisational issues are recognised based on individual experience (Crossan et al., 1999). Individual factors have a clear impact on individual learning and they may, to some extent, be able to partly explain organisational learning. Back and Seaker (2004) posited that personality types are correlated with the style of learning people prefer. Personality traits are found to be a determining factor of learning styles (Furnham, Jackson, & Miller, 1999).

Despite the recognition of the importance that individual learning processes have on the organisation, only limited studies have estimated the effect of personality traits on organisational learning. Personality is a psychological concept while learning is mostly cognitive. Huber's (1991) framework (see above) has the potential to explain how the effects of personality can be transferred to cognitive learning. This is easily done if one realizes that information distribution, for example, requires a particular prosocial personality to be executed: or, for example, knowledge interpretation is mostly based on social psychological mechanisms that operate together with the most obvious cognitive processes. In other words, the characterisation of Huber's model provided above indicates that workers' personalities are extremely important to understand proactive engagement in organisational knowledge-generation processes.

This research adopts the Big Five personality traits to understand the relationship between personality traits and organizational learning. The reason for selecting the Big Five is because it is a dominant framework that is used for personnel selection (Hurtz & Donovan,

2000). Modern personality research uses the Big Five to systematically categorise personality traits at the broadest level (Flynn, Chatman, & Spataro, 2001). The Big Five are also considered as a ‘parsimonious and comprehensive’ way to describe the human sphere (Gupta, 2008, p.147). The Big Five traits comprise neuroticism, extraversion, agreeableness, openness to experience and conscientiousness.

This paper focuses on three traits of the five traits – conscientiousness, openness to experience, and neuroticism. This is because the literature suggests that conscientiousness and neuroticism are robust and consistent predictors of job attitudes (Judge & Ilies, 2002), while openness to experience is often used to explain knowledge sharing and decision making in organisations (LePine, Colquitt, & Erez, 2000). Therefore, these three traits should be particularly relevant in understanding the relationship between personality traits and organisational learning.

Openness to experience. Openness to experience is often linked to characteristics such as being imaginative and open-minded, and having aesthetic sensitivity, originality and intellectual curiosity (Barrick & Mount, 1991). People with high levels of openness are willing to engage in self-monitoring and assessment which is necessary for identifying learning possibilities (Blickle, 1996). Open individuals tend to try new things, experience different feelings, and embrace changes (LePine et al., 2000). Hence, open individuals are more ready to participate in learning (Barrick & Mount, 1991) and tend to have a high learning orientation (Matzler et al., 2011). Individuals high in openness to experience are more willing to query other people’s insight and share their own knowledge; thus it is anticipated that open individuals are more likely to be involved in knowledge acquisition and dissemination with teams (Matzler et al., 2011).

Hypothesis 1: Openness to experience is positively related to organisational learning.

Conscientiousness. Conscientious people are considered to be independent, organised, responsible, achievement-oriented and perseverant (Barrick & Mount, 1991). People who are perseverant tend to be committed to their goals regardless of difficulties they are facing, and they are more likely to weigh different information in order to accomplish tasks (LePine et al., 2000). People who assess different pieces of information might achieve a more accurate interpretation; resulting in better decision making than that of people who are less conscientious (LePine et al., 2000). Furthermore, empirical studies on organisational citizenship found that conscientiousness drives people to work on extra things which go beyond their job requirement, and conscientious people also enjoy working with other people in a team and helping organisations as a whole (Organ, 1994). It is rational to predict that people enjoying their affiliation with an organisation are more likely to be willing to exchange information resulting in better knowledge sharing in the organisation. Empirical research among IT professionals has shown that a high level of conscientiousness is positively related to tacit knowledge sharing (Borges, 2013). Highly conscientious people also show high tendencies of documenting knowledge for organisational usage (Matzler et al., 2011). While new knowledge is institutionalised, it will become part of organisational memory to guide future decision-making. Consequently, it will contribute to organisational learning.

Hypothesis 2: Conscientiousness is positively related to organisational learning

Neuroticism. Neuroticism is sometimes termed “emotionality” or “negative affectivity” (Watson & Clark, 1984). People with high neuroticism are likely to experience anxiety, stress and depression, and negative self-assessment (Gore, Kiefner, & Combs, 2012).

Highly neurotic people are less willing to share tacit knowledge (Borges, 2013); it is more challenging for them to adjust to new circumstances (Gore et al., 2012); they tend to be less satisfied with their job (Barrick, Mount, & Judge, 2001); and they are more likely to remember negative workplace experiences (Watson & Clark, 1984). Organisational learning requires employees' participation in detecting and correcting the problematic aspects of their own behaviour, and in turn, it improves the processes of large organisations (Mazutis, Slawinski, & Slaiwinski, 2008). Highly neurotic people are less confident in promoting their own opinions and handle criticism from other people in a way that has negative repercussions for them (Borges, 2013). Institutionalised learning often involves negotiation and argument in order to achieve a shared mental map before learning happens (Huber, 1991) and neurotic people may find the process stressful.

Hypothesis 3: Neuroticism is negatively related to organisational learning.

2.3 Organisational defensive routines

Organisational routines are defined as “a repetitive, recognizable pattern of interdependent actions, involving multiple actors” (Feldman & Pentland, 2003, p. 96). This definition is in line with the current understanding of routines which are composed by principles (ostensive aspect) guiding people's behaviour and multiple people's interactive behaviour (performative aspect). Understanding the dynamics of routines is done from a performative perspective which considers individuals as agents of behaviour. The dynamic of routines has two facets – variation with the same pattern and variation with different patterns (Feldman et al., 2016). In respect to ODRs, individuals adopt different types of strategy to deceive their bypassing and covering-up behaviour, but their behaviours hold the same

pattern (Argyris, 1990).

ODRs are guided by shared beliefs: to be in unilateral control, to win, and not to upset people (Argyris, 1990; Noonan, 2007). These shared beliefs are supported by socially accepted virtues: “1) caring, help, and support; 2) respect for others; 3) honesty; 4) strength; and 5) integrity” (Argyris, 1990, p.19). Because people’s rationalization of their defensive behaviour is built on social virtues which prevent people from reflecting their behaviour, the absence of a reflective space becomes a barrier for organisations to identify new routines and improve organisational learning (Bucher & Langley, 2016). ODRs become a taken-for-granted behaviour in a social context in which avoiding embarrassment and threat is prevalent behaviour. These routines involve multiple people to cover or bypass organisational issues related to embarrassment or threat to either party involved. To some extent, these routines create a harmonious working environment and incrementally improve organisational performance in a way similar to the single-loop learning mechanisms mentioned by Argyris (1990). However, this kind of routine limits organisational abilities to identify the core reasons of potentially important problems. Also, it prevents organisations from achieving upper levels of learning, such as those labelled double-loop learning mechanisms by Argyris (1990).

The ways ODRs influence individuals’ behaviour can be explained with reference to social cognitive studies. Social cognitive studies posit that the social context influences an individual’s way of interpreting information that people generate or information that is received from other people (Fiske & Taylor, 2013). In particular, attribution theory suggests that individuals’ behaviour is an outcome of personal attributions and contextual attribution (Augoustinos, Walker, & Donaghue, 2009). In our context, individuals perform defensive routines because they believe that it is rational to shy away from possible embarrassment and threat. This defensive behaviour might be influenced by a culture which treats failure and

conflict as embarrassment (Secchi & Bardone, 2013). This defensive routine tends to be stable and inert because unlearning this kind of routine challenges individuals' assumptions of what they perceive as their rational behaviour. In particular, when changing defensive routines requires people to disclose hidden information, this can trigger emotional resistance, and if the beliefs are not changed, a relapse to old routines is likely to occur (Fiol & O'Connor, 2017). Additionally, changing routines requires agents to discuss and reflect on routines so that alternative options can emerge (Dittrich et al., 2016). However, the nature of defensive routine prevents agents from genuine communication. Thus, change of ODRs becomes incredibly challenging in organisations.

According to Bandura (2012), people learn their behaviour via interpersonal influences and by observation. In return, their learned behaviour will shape or reinforce the external environment (Bandura, 2012). For defensive routines, individuals compile mixed messages to avoid evoking embarrassment for themselves or others. The message receivers may recognise the inconsistency of the information, but sometimes may decide to be in congruence with the message senders' way of dealing with the source of embarrassment. This double-blind way to conceal the cause of embarrassment makes it really challenging to identify ODRs (Argyris, 2001). Consequently, individuals behave defensively because it is socially acceptable.

Changing routines involves participants to talk about the situation and explore alternative solutions (Dittrich et al., 2016). If the change initiators are constantly suppressed, employees become frustrated and silence their opinions (Aroles & Mclean, 2016). For example, printers are forced to comply with old routines to avoid further conflict with managers (Aroles & Mclean, 2016). Individuals' motives to perform ODRs depend on their self-assessment about whether their candid opinion may cause embarrassment or expose themselves to risk. This self-assessment is conducted privately in an individual's mind.

Without deliberate reflection initiated by an external source (e.g., consultants) on their behaviour, individuals consider this behaviour as rational (Noonan, 2007). Their rationality comes from their deepest and most implicit assumption which is to defend themselves from pain and simultaneously cover up the cause of pain (Senge, 1991). Restrictions on talking about established routines could delay or prevent organisational change (Dittrich et al., 2016). The higher level of ODRs organisations have, the more challenging it becomes to identify the hidden issues and change routines.

From an individual perspective, the motive of performing defensive routines is seen as related to an individual's cognition (e.g., their mental assumptions about embarrassment and change) and external stimuli from the social context. Why do other people (e.g., co-workers, managers, etc.) collude with this dysfunctional behaviour? One way to understand this integration process from individual level to organisational level is to consider ODRs as a collective behaviour that is distributed to individuals in organisations. However, it should not be misunderstood that ODRs are a simple sum of individuals' defensiveness: rather ODRs are understood as a phenomenon that supports and stimulates individual defensiveness. Argyris simply put it thus: "people are the carriers of defensive routines, and organizations are the hosts. Once organizations have been infected, they too become carriers" (Argyris, 1985 cited in Senge 1991, p. 234). Hence, individual defensive routines and ODRs reinforce each other. Studying one without the other could generate incorrect understanding of ODRs.

According to social cognition, ODRs are considerably stable and automatic. When a cognitive process meets any of the following qualities – unintentional, uncontrollable, efficient, autonomous responses, and outside awareness – it is considered automatic (Bargh, 1989). In terms of the process of ODRs, these are people's effortless behaviour under a situation which is most likely to cause embarrassment and threat to the initiators or receivers in the workplace (Argyris, 1990). People's defensiveness results in anti-learning attitudes and

limits learning at all levels, but people who are involved in the process of ODRs tend to shift blame on to other people and fail to realise their own contribution to such counterproductive behaviour (Noonan, 2007). Hence, defensive behaviour also is an unintentional and undeliberate behaviour in situations where embarrassment and threat are mostly likely to be stimulated; therefore, it is context-based. Because of automatic characteristics of ODRs, it shares the characteristics as general routines being repetitive, recurrent and stable.

2.4 Organisational defensive routines: Hypotheses development

Hypotheses 1 to 3 posit that individuals' personality traits (openness to experience, conscientiousness, neuroticism) influence and contribute to explain organisational learning. But what role do ODRs play in this relationship?

People with high openness to experience show willingness to knowledge sharing and learning (Matzler et al., 2011). When ODR levels are high in organisations, certain organisational issues which may elicit embarrassment or threat are considered as inappropriate or risky to reveal. In other words, ODRs are taken-for-granted behaviours among employees who do not think it is rational for them to openly discuss some issues. This kind of routine constrains people with high openness to experience from freely expressing their opinions. Consequently, it will demotivate 'open' people to share their knowledge.

Hypothesis 4: *Organisational defensive routines moderate the relationship between openness to experience and organisational learning, such that the relationship is weaker when employees perceive high levels of organisational defensive routines.*

Organisations with high ODRs tend to use ambiguous language to convey negative messages (Noonan, 2007). The opaque information can be misleading for employees. Given that conscientious people are goal-driven (Barrick et al., 2001), they may find it frustrating to work on a vague goal. If they clarify the ambiguity of the message, they will have to query the reason why the message was designed as ambiguous in the first place, which could embarrass the message initiator. If they pretend the non-existence of ambiguity of the message, they may end up doing the wrong things. High ODRs also cause certain valuable information to be ‘brushed under the carpet’ (Argyris, 1990). The fragmented information creates barriers for people with high conscientiousness from acquiring a correct understanding of the situation. When people’s abilities to identify errors are constrained by the organisational defensive routine, it is challenging to generate learning in organisations. Thus, we hypothesise:

***Hypothesis 5:** Organisational defensive routines moderate the relationship between conscientiousness and organisational learning, such that the relationship is weaker when employees perceive high levels of organisational defensive routines.*

Highly neurotic people were predicted to be not good at adjusting to changes (Watson & Clark, 1984). Organisations with high ODRs tend to avoid conflict and embarrassment, so the working environment seems ‘nice’, whereas this so-called ‘nice’ working environment only produces temporary changes in behaviour, or mediocre adjustment to current organisational practice (Argyris, 1990). Neurotic people working in this kind of organisation find it comfortable. It may reinforce neurotic people’s negative thinking on change and it may encourage neurotic people to hold valid information which may trigger the change in organisations.

***Hypothesis 6:** Organisational defensive routines moderate the relationship between neuroticism and organisational learning, such that the relationship is stronger when employees perceive high levels of organisational defensive routines.*

Figure 1 integrates these six hypotheses, proposed above, in our proposed model.

Insert Figure 1 about here

3. Method

3.1 Data and sample

Data for this research were collected using a professional online survey design tool, Qualtrics, after requirements for the sample were specified. Our sample is UK employees who have been working in UK-based organisations. The company sent the online survey link to potential participants. We required that all the participants should have been working in their organisations for at least one year, because people who had worked there less than a year may not be familiar with their organisational structure, policies and procedures involving learning. This restriction on employees' tenure guarantees that participants have the knowledge to provide us more or less accurate information related to their organisations.

The sample comprised 440 participants who completed the survey. After deleting unengaged participants, cleaning for missing data, and other related issues, we obtained the final usable data from 351 participants; 51.4% were males, 48.6% were females, and 79% held full-time jobs at the time of the survey. The average age is 38 and the standard deviation is 11.66.

In terms of reducing common method bias, the researchers randomised the order of questions (Podsakoff et al., 2003). The researchers also employed the Harman single-factor test by forcing all the predictors and outcome variables to load on to one factor to check for common method bias. The results show that one factor only explains 20.71% of total variance. Statistically this suggests there is no common method bias issue.

3.2 Variables

The main predictors of the study are conscientiousness, openness to experience, and neuroticism. Additionally, we controlled for gender, education, age, tenure, and job status (full time or part time). Job positions in organisations have an influence on the knowledge of organisational issues. Generally, people at the managerial level are more involved than general staff in decision-making about organisational change and learning. Full-time employees spend more time in organisations, so their opinions may differ from those of people working part-time. We also controlled for size of organisations due to their known influence on organisational learning.

3.3 Measures

Participants indicate their agreement with each item using a 7-point Likert-type scale running from 1 (strongly disagree) to 7 (strongly agree).

Organisational learning. A measurement developed by Pérez López, Peón and Ordás (2004) and tested by Jiménez-Jiménez and Sanz-Valle (2011) and Pérez López, Peón and Ordás (2005) is used for this study. Thirteen items measure organisational learning. The overall scale has good reliability, with a Cronbach's alpha of 0.91. Knowledge acquisition is

measured by three items ($\alpha = 0.73$); Knowledge distribution is measured by three items ($\alpha = 0.74$). Knowledge interpretation ($\alpha = 0.73$) and organisational memory ($\alpha = 0.82$) are measured by four items.

Independent Variables: We measured these three traits with 27 items from John and Srivastava's (1999) work using nine items for conscientiousness ($\alpha = 0.83$), eight items for neuroticism (0.83) and ten items for openness to experience (0.77).

Organisational defensive routines: The measurement of organisational defensive routines is newly developed by us in another study. In that study, we have followed a rigorous process on developing a scale suggested by DeVellis (2012) and Hinkin (1998). This is a newly developed measurement and is composed of six items. These items measure ODRs based on the individual's perception. The scale has gone through exploratory factor analysis, confirmatory factor analysis, and discriminant and convergent validity tests (Yang, Secchi & Homberg, 2017). Results of the tests show the scale is reliable and meets the most referenced cut-off points (Hu & Bentler, 1999; Nunally, 1978). The measure contains two factors: embarrassment avoidance ($\alpha = 0.80$), and rigidity at work ($\alpha = 0.77$). The overall Cronbach's alpha for measuring ODRs is 0.74. The full scale is listed in Appendix 1.

3.4 Descriptive information

Means, standard deviation, reliability coefficients and correlations for the measures appear in Table 1. Before addressing our hypotheses, it is worth noting that organisational learning is negatively correlated with neuroticism ($r = -0.32, p < 0.01$), but positively correlated with conscientiousness ($r = 0.19, p < 0.01$) and openness ($r = 0.32, p < 0.01$). Organisational learning is not correlated with ODRs ($r = -0.04, p > 0.05$). ODRs are positively and significantly correlated with neuroticism ($r = 0.45, p < 0.01$), but negatively

and significantly correlated with conscientiousness ($r = -0.37, p < 0.01$) and openness ($r = -0.29, p < 0.01$). This suggests that people with high neuroticism generally tend to display more defensiveness in a situation when embarrassment and threat may occur.

Insert Table 1 about here

3.5 Personality traits and organisational learning

We used multiple regression analyses to examine the relationship between personality traits and organisational learning. ODRs and variables for personality traits are centred. The Variance Inflation Factor (VIF) for all the variables is at acceptable levels with mean VIF = 1.35. The single highest VIF is 1.76. Thus, we have no strong concerns about multicollinearity.

The main results are presented in Table 2. Model 1 (see Table 2) only includes control variables and shows that only organisational size is positively associated with organisational learning. That means that, as organisations get larger, they have more resources to establish an efficient learning process. Model 2 adds the main predictors – namely conscientiousness, neuroticism and openness – to experience. It shows that conscientiousness ($\beta = -0.02; p = 0.76$) does not have any influence on organisational learning. Neuroticism can negatively and significantly predict organisational learning ($\beta = -0.26; p < 0.001$). Openness to experience also has a significant and positive influence on organisational learning ($\beta = 0.34; p < 0.001$). Therefore, Hypothesis 1 is rejected while Hypothesis 2 and Hypothesis 3 are supported.

Model 3 (see Table 2) investigates the interactions between ODRs and the three personality traits of interest (conscientiousness, neuroticism, openness). Unexpectedly, Model

3 shows that ODRs ($\beta = 0.18$; $p < 0.001$) have a positive and significant direct association with organisational learning. However, the correlation test on ODRs and four components of organisational learning indicates that ODRs ($r = -0.11$, $p < 0.01$) are only significantly related to knowledge interpretation. That means that the higher the ODRs are, the weaker knowledge interpretation is.

Although, theoretically, we have proposed that ODRs will negatively moderate the relationship between personality (conscientiousness, neuroticism and openness) and organisational learning, the result of data analysis (see Model 3) does not support these hypotheses. That means that the level of ODRs does not have a statistically significant effect on the relations between personalities and openness to experience ($\beta = 0.04$, $p = 0.60$), conscientiousness ($\beta = -0.07$, $p = 0.32$) and neuroticism ($\beta = 0.06$, $p = 0.23$), and organisational learning. Hence, Hypotheses 4, 5 and 6 on the moderation effect of ODRs are not supported. Because these findings deviate from theory as presented in earlier sections we continued with the analyses. Thus, we used regression analysis to test what the effects of ODRs' sub-factors are on the components of organisational learning. The results indicate that rigidity significantly and positively relates to organisational memory ($\beta = 0.48$, $p < 0.05$) only. This is consistent with Argyris' (1990) theory on ODRs leading to routine learning. 'Embarrassment avoidance' is significantly and positively related to all the components of organisational learning. This finding contradicts the existing literature which advocates the negative influence of ODRs on organisational performance, decision-making, and learning (e.g., Argyris, 1990; Ashforth & Lee, 1990; Noonan, 2007).

Organisations with a certain level of ODRs still can learn incrementally, but the learning becomes a predicament when ODRs become ferocious (Argyris, 1990). Based on this theoretical proposition, we applied non-linear regression to see if the relation is an inverted U-shaped one. The result of this additional analysis (see Table 3) indicates that the

non-linear regression model only adds an extra 0.02 explanation of variance of organisational learning. Hence, we infer that the linear model is still better suited to explain the studied relationship.

Insert Table 2, Table 3 about here

3.6 Robustness checks

Considering that many researchers posited that individuals contribute with varying extents to different processes of organizational learning (e.g., Crossan, Maurer, & White, 2011; Huber 1991; Kim 1993;), we would expect that some personality traits may have more influence on certain components of organisational learning than others have. Based on this assumption, we carried out additional checks to see if our data support this theoretical deduction. The result showed that openness to experience is positively and significantly related to all the four components of organisational learning. In contrast, neuroticism is negatively and significantly related to all the four components of organisational learning. The only trait tested that displayed a varied relationship with these four components is conscientiousness. The result shows that conscientiousness is negatively and significantly related to knowledge acquisition ($\beta = -0.24$; $p < 0.001$), but negatively and significantly related to knowledge distribution after removing control variables from the model ($\beta = -0.19$; $p < 0.05$). Conscientiousness is positively and significantly related to knowledge interpretation ($\beta = 0.16$; $p < 0.05$), but is not significantly related to organisational memory ($\beta = 0.02$; $p < 0.81$). Tables showing the results of the robustness check can be accessed through supplementary material.

4. Discussion

This study makes three contributions to the literature. First, by examining three well-studied personality traits — conscientiousness, neuroticism and openness to experience — and organisational learning, it empirically confirms that individual traits are associated with organisational learning. Hopefully, this will stimulate more empirical studies to explore what other individual factors can affect organisational learning. Second, the positive relationship found between ODRs and organisational learning brings a novel perspective to the existing literature on ODRs and learning. Third, the findings of this study benefit practitioners wishing to improve learning capabilities by carefully selecting people.

In this study, we did not find statistical support for our hypotheses that ODRs negatively moderate the relation between selected personality traits and organisational learning. However, an interesting finding about the positive relationship between organisational learning and ODRs could stimulate further research in the future; there are two potential explanations for this finding. Firstly, ODRs may be a more multi-faceted concept than originally proposed by Argyris. Although Argyris tends to attribute the roots of organisational dysfunctions to organisational defensive routines and politics, some authors (e.g., Miner & Mezias, 1996) pointed out that avoiding embarrassment is not necessarily negative behaviour. In fact, such behaviour may be seen as part of the normal process of resolving differences of opinion between organisational members and an inevitable consequence of the different interests that are created by the process and technology of organising (Easterby-Smith, Snell, & Gherardi, 1998, p. 263). Miner and Mezias (1996) suggested that covering up and bypassing issues related to embarrassment and threat will only encourage incremental and routine learning that are important features of organisational development too. ODRs have not been studied as proficiently as incremental learning.

Secondly, it was explicitly stated by Argyris (1990, 2001) and agreed by some other scholars (e.g., Riley, Cudney, & Long, 2013; Yau & Cheng, 2011) that ODRs are anti-

learning in nature. However, organisational learning can take various shapes. Argyris (1990) distinguished between single-loop and double-loop learning. Fiol and Lyles (1985) equated single-loop learning to low levels of learning, and double-loop learning to high levels of learning. It was not clear if “anti-learning” here means a specific kind of learning. Most of Argyris' (1990, 1993, 2002) work focuses on advocating the idea of dysfunctional effects of ODRs on double-loop learning. If learning can be divided into levels, maybe organisational learning should be measured against the different levels of learning. Our findings may reveal to be different and this implies that more research is needed. Building on the thought of measuring organisational learning based on levels, we also agree with Huber (1991) that different levels of learning may be extremely difficult to isolate empirically as one aspect can overlap and/or be intertwined with another as well as mask or determine another. Thus, the complexity of measuring organisational learning may have also contributed to the seemingly unusual finding.

This study also revealed how individuals' personality traits affect organisational learning. Neuroticism has a negative effect on organisational learning and openness to experience has a positive influence on organisational learning. Although research on academic and job performance has produced consistent and positive findings on conscientiousness (e.g., Barrick et al., 2001; Blickle, 1996), this study is not able to support them. One plausible reason to explain why conscientiousness does not explain learning in this study stems from the perspective of learning itself. Learning is about potentially changing behaviours (Huber, 1991). Hence, individuals who are open minded and who think ‘out of the box’ are more likely to identify alternative ways of improving their work. People high on conscientiousness have the characteristics of order, dutifulness and deliberation (Barrick & Mount, 1991) which are important for goal achievement. However, people with high conscientiousness could be too focused on following orders and, thus, do not notice the need

for change in their behaviour for the purpose of better learning. This characteristic of conscientiousness could also restrict people from accepting new knowledge. This is evident from the result of further data analysis which shows that conscientiousness is negatively related to knowledge acquisition and knowledge distribution. Naturally, highly conscientious people are not as good at adapting to a changing task as people with low levels of conscientiousness (LePine, Colquitt, & Erez, 2000). Originally, we thought that being orderly and perseverant could help individuals to restore knowledge in organisations so that they could contribute to organisational learning (Matzler et al., 2011). However, we did not consider the possibility that individuals scoring high in conscientiousness could prefer to maintain routines rather than seek new ways of doing things. Knowledge interpretation is the only component of organisational learning which was positively related to conscientiousness in this study. This finding could be explained by the thorough, careful and task-oriented nature of the trait of conscientiousness (Barrick & Mount, 1990).

Our finding reveals the importance of individual personality traits for organisational learning. It empirically confirms the important role of individual learning in collective learning (Crossan et al., 2011; Huber, 1991; Kim, 1993). The finding also advances our understanding of absorptive capacity through individuals' personality traits. Kim (1993) pointed out that organisational learning is a function of absorptive capacity. Based on this view, we can deduce that individuals in organisations can potentially influence absorptive capacity. In particular, managers who can logically store knowledge and modify the knowledge based on situations could contribute to improve absorptive capacity (Volberda et al., 2010). Personality traits as an enduring individual difference factor have an impact on the ways knowledge is stored and shared, which has been discussed in some studies (e.g., Gupta, 2008; Matzler et al., 2011). Our further data analysis section also reveals that openness to experience and neuroticism have a consistent influence on all the four

components of organisational learning; however, this does not mean that we can use personalities to predict absorptive capacity. This is because absorptive capacity is a composition of two elements: prior knowledge base and intensity of effort (Kim, 1993). Some individuals could be good at accumulating prior knowledge, but not at intensity of effort.

Theoretically, this paper attempts to enrich the theory of organisational routine dynamics through the study of a particular subset of routines named ODRs. According to a recent study “the central to routine dynamics is the generative nature of social phenomena” (Feldman et al., 2016, p.506). This research has shown that ODRs are enhanced via social interactions during which people unconsciously reinforce each other’s defensive behaviour. This reciprocal defensive behaviour is situated at a level where people believe that revealing their genuine thoughts could get them (or others they care about) in trouble. By highlighting these interactional aspects of ODRs we have echoed the idea of routines being patterns of action (Feldman et al., 2016). To break the pattern of routines, actors need to consciously reflect on their behaviour and thinking through open communication with all involved parties (Dittrich et al., 2016). This study shows that the extent of openness can be influenced by actors’ personalities resulting in either high or low levels of ODRs.

5. Limitations, future research and concluding remarks

Our study has some limitations that require discussion. First, the measures of organisational learning and ODRs are based on individual perception. This creates a potential issue of whether respondents are able to answer correctly questions, in particular, on organisational learning. In this research, we have tried to reduce this problem by controlling participants’ tenure as higher levels of tenure would make individuals more knowledgeable

about the organisation, its processes and, in particular, how knowledge is generated and stored. But we acknowledge that it is inevitable that some respondents may have biased views due to their bounded rationality and the extent of their involvement with organisations. Future research could collect data based on teams to check whether there are consistent findings across different levels of learning. Second, we have grounded our model on the moderating effect of ODRs on the relationship between personality traits and organisational learning. Hence our attention did not focus on exploring how personality traits contribute to ODRs. For example, the data in this study showed a high correlation between neuroticism and ODRs. Neuroticism has also been found to be an explanatory factor to employees' behaviour on censoring organisational information (Brinsfield, 2013). This points to a potential mediating effect of ODRs on the relationship between personality traits and organisational learning and deserves further exploration in future research. The third limitation is related to the measurement of organisational learning. Due to the divergent and complex concept of learning at the organisational level (Easterby-Smith et al., 1998), it is easy to conceptualise learning, but it proves challenging to systematically study it with quantitative studies (Miner & Mezias, 1996). The measurement has proven to be robust (Pérez López et al., 2004), but it did not divide learning into low and high levels as the literature suggests. Therefore, using this measurement may not be ideal. Our measurement choice is restricted by the lack of valid measurement scales on low or high levels of organisational learning to the current time.

Furthermore, the way we collected samples may have some influence on the finding. ODRs are an automatic and unconscious behaviour that employees perform in organisations. They become more prevalent when people are going through changes in organisations (Noonan, 2007). Because changes involve uncertainty and risk, this uncertainty of future can catalyse ODRs in organisations to maintain the status quo. Longitudinal data collected when

organisations are going through turbulence will capture this negative performance better and future research should strive to collect such data.

In conclusion, this study did not find any of the hypothesised moderating effects of ODRs on the relationship between personality and organisational learning, but it offers first evidence that the current understanding of the effect of ODRs on organisational learning is to be discussed further and probably challenged. Apart from the results that are relevant to ODRs, this study also empirically shows that personality can influence organisational learning.

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Table 1
Descriptive statistics

	Mean	Std.	1	2	3	4	5	6	7	8	9	10	11
1. Gender	0.52	0.50											
2. Age	38.50	11.63	0.11										
3. Education	2.28	1.01	-0.10	-0.19**									
4. Tenure	2.92	1.43	0.15**	0.52**	-0.15**								
5. Firm Size	3.03	1.03	0.06	0.01	0.14**	0.14**							
6. Full time	0.78	0.41	0.29**	-0.03	0.08	0.07	0.10						
7. Supervisors	0.50	0.50	0.14**	0.16**	0.14*	0.15**	-0.18**	0.17**					
8. Conscientiousness	5.17	0.87	-0.08	0.31**	-0.14*	0.15**	-0.04	-0.01	0.11*	0.83			
9. Neuroticism	3.69	1.07	-0.08	-0.16**	-0.02	-0.11*	-0.05	-0.08	-0.15**	-0.48**	0.83		
10. Openness	4.74	0.77	0.03	0.07	0.15**	-0.03	-0.05	0.05	0.20**	0.38**	-0.22**	0.77	
11. iODR	3.93	1.06	0.05	-0.33**	-0.03	-0.12*	0.07	0.03	-0.25**	-0.37**	0.45**	-0.29**	0.74
12. OL	4.74	0.96	0.02	-0.03	0.10	0.02	0.12*	0.08	0.05	0.19**	-0.32**	0.32**	-0.04
													0.91

Note: N=351; *p<0.05; **p<0.001

1. OL= organisational learning
2. iODR= individual organisational defensive routines
3. Cronbach's alpha are displayed on the diagonal in bold font
4. Full time is coded as "1", others are coded as "0"

Table 2
Multiple regression for organisational learning

DV=OL	Model1		Model2		Model3	
	β	p	β	p	β	p
(Constant)	4.19	0.00	4.59	0.00	4.42	0.00
Gender	0.00	1.00	-0.04	0.69	-0.08	0.43
Age	0.00	0.59	-0.01	0.11	0.00	0.44
Education	0.06	0.25	0.02	0.69	0.03	0.61
Firm Size	0.11	0.04	0.11	0.03	0.11	0.03
Full time	0.11	0.40	0.07	0.58	0.05	0.71
Supervisors	0.12	0.29	-0.02	0.82	0.03	0.76
Tenure	0.01	0.82	0.02	0.57	0.01	0.82
Conscientiousness			-0.02	0.76	-0.03	0.73
Neuroticism			-0.26	0.00	-0.31	0.00
Openness			0.34	0.00	0.37	0.00
iODR					0.18	0.00
iODR* Conscientiousness					-0.07	0.32
iODR * Neuroticism					0.06	0.23
iODR * Openness					0.04	0.60
<hr/>						
Observation (351)						
Adjusted R ²	0.01		0.17		0.19	
F	F(7), 1.50, p=0.17		F(10), 7.98, p<0.001		F(14), 6.94, p<0.001	

Note: *p<0.05; **P<0.001

1. Job status is dummy variable. Full time is coded as 1, part-time is coded as 0.
2. Supervisors are coded as 1. General staff is coded as 0.

Table 3

Curvilinear regression analysis: ODRs and organisational learning

DV= OL	Model1		Model 2	
	β	p	β	p
Constant	3.48	0.00**	5.05	0.00**
Conscientiousness	-0.02	0.74	-0.04	0.54
Neuroticism	-0.31	0.00**	-0.32	0.00**
Openness	0.38	0.00**	0.35	0.00**
iODR	0.19	0.00**	-0.56	0.02*
iODR_squared			0.10	0.00**
Observation (351)				
Adjusted R ²	0.18		0.20	
F	F (4), 20.5, p < 0.001		F (5), 18.70, p < 0.001	

*Note: *p<0.05; **P<0.001*

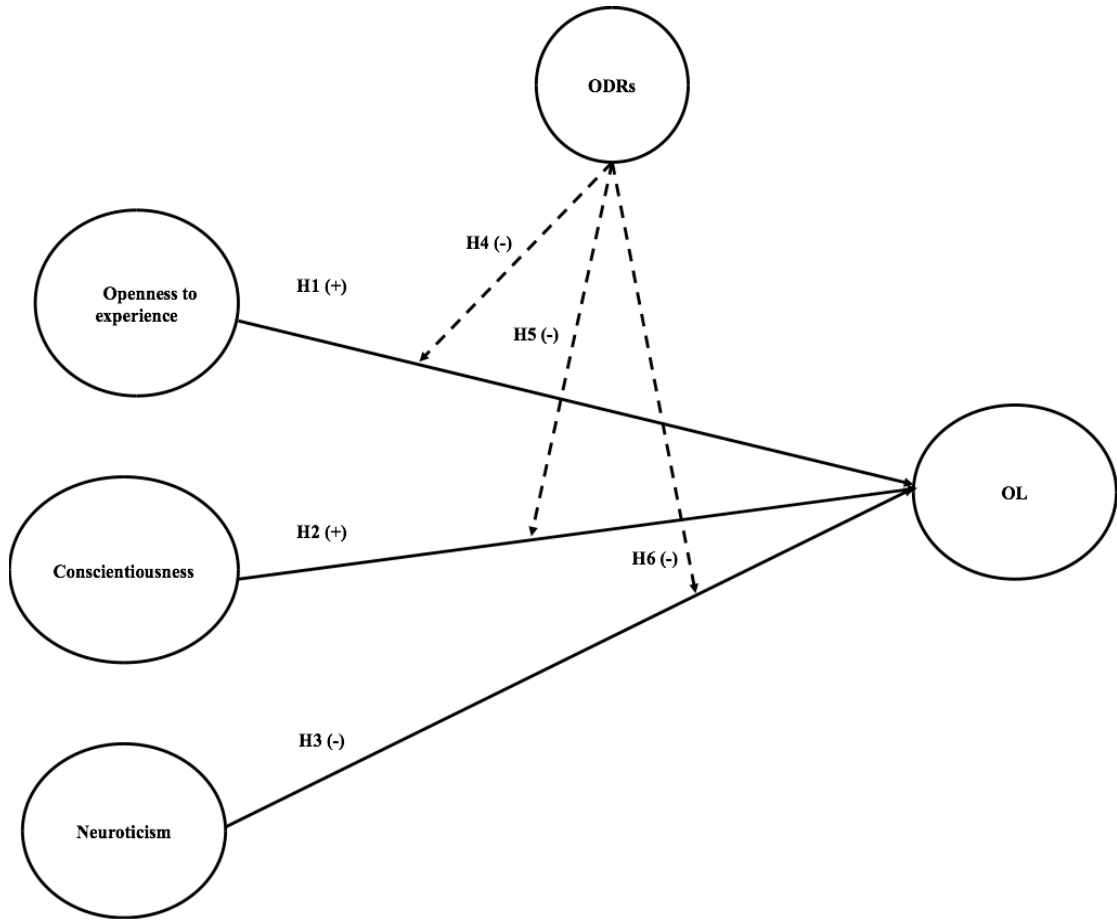


Figure1. Conceptual model of the relationship between the variables

Note: Solid line indicates direct relationship and the dotted line indicates moderating relationship. ODR: Organisational Defensive Routines; OL: Organisational Learning

Robustness test: we carried robustness check by the relationship between independent variables and each components of organizational learning. These components are knowledge acquisition, knowledge dispersion, knowledge intergradation and organizational memory.

Table 1: knowledge acquisition as a dependent variable

DV= KA	Model1		Model2		Model3	
	β	p	β	p	β	p
(Constant)	4.02	0.00*	4.36	0.00**	4.19	0.00**
Gender	0.02	0.89	-0.08	0.52	-0.13	0.33
Age	-0.01	0.20	-0.01	0.12	-0.01	0.47
Education	0.16	0.02*	0.09	0.15	0.09	0.14
Firm Size	0.04	0.49	0.03	0.60	0.03	0.61
Full time	0.12	0.46	0.09	0.58	0.05	0.73
Supervisors	-0.01	0.94	-0.14	0.28	-0.08	0.56
Tenure	0.05	0.39	0.06	0.26	0.04	0.39
Conscientiousness			-0.24	0.00**	-0.24	0.00**
Neuroticism			-0.34	0.00**	-0.40	0.00**
Openness			0.33	0.00**	0.37	0.00**
iODR					0.20	0.01*
iODR*						
Conscientiousness					-0.07	0.41
iODR * Neuroticism					0.07	0.27
iODR * Openness					0.09	0.30
<hr/>						
Observation (351)						
Adjusted R ²		0.01		0.12		0.14
F		F(7), 1.64, p=0.12		F(10), 5.69, p<0.001		F(14), 5.85 p<0.001

Note: *p<0.05; **P<0.001

1. Job status is dummy variable. Full time is coded as 1, part-time is coded as 0

2. Supervisors are coded as 1. General staff is coded as 0.

Table 2: knowledge distribution as a dependent variable

DV=KD	Model1		Model2		Model3	
	β	p	β	p	β	p
(Constant)	3.60	0.00**	3.61	0.00**	3.61	0.00**
Firm Size	0.33	0.00**	0.33	0.00**	0.31	0.00**
Conscientiousness			-0.21	0.01*	-0.19	0.02*
Neuroticism			-0.30	0.00**	-0.33	0.00**
Openness			0.42	0.00**	0.43	0.00**
iODR					0.15	0.03**
iODR*						
Conscientiousness					-0.17	0.05
iODR * Neuroticism					0.01	0.87
iODR * Openness					0.08	0.35
Observation (351)						
Adjusted R ²		0.08		0.2		0.21
F	F(1), 30.66, p < 0.001		F(4), 22.23, p<0.001		F(8), 12.71, p<0.001	

Note: *p<0.05; **P<0.001

1. Job status is dummy variable. Full time is coded as 1, part-time is coded as 0
2. Supervisors are coded as 1. General staff is coded as 0.

Table 3: knowledge interpretation as a dependent variable

DV=KI	Model1		Model2		Model3	
	β	p	β	p	β	p
(Constant)	5.15	0.00**	5.61	0.00**	5.47	0.00**
Gender	-0.10	0.44	-0.09	0.46	-0.13	0.28
Age	0.01	0.20	0.00	0.86	0.00	0.57
Education	0.01	0.87	-0.01	0.88	-0.01	0.81
Firm Size	-0.07	0.26	-0.07	0.21	-0.07	0.22
Full time	-0.06	0.72	-0.11	0.44	-0.14	0.30
Supervisors	0.12	0.34	-0.03	0.78	0.02	0.86
Tenure	-0.05	0.28	-0.04	0.37	-0.05	0.27
Conscientiousness			0.17	0.04*	0.16	0.04*
Neuroticism			-0.22	0.00**	-0.26	0.00**
Openness			0.31	0.00**	0.35	0.00**
iODR					0.14	0.05*
iODR*						
Conscientiousness					-0.03	0.73
iODR * Neuroticism					0.09	0.12
iODR * Openness					0.14	0.09
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Observation (351)						
Adjusted R ²		0		0.16		0.17
F	F(7), 0.92, p < 0.001		F(10), 7.43, p<0.001		F(14), 6.24, p<0.001	

Note: *p<0.05; **P<0.001

1. Job status is dummy variable. Full time is coded as 1, part-time is coded as 0

2. Supervisors are coded as 1. General staff is coded as 0.

Table 4: Organizational memory as a dependent variable

DV=OM	Model1		Model2		Model3	
	β	p	β	p	β	p
(Constant)	4.06	0.00	4.52	0.00	4.36	0.00
Gender	-0.04	0.78	-0.08	0.56	-0.11	0.38
Age	0.00	0.76	-0.01	0.16	0.00	0.51
Education	0.06	0.38	0.01	0.87	0.02	0.78
Firm Size	0.13	0.04	0.13	0.03	0.13	0.04
Full time	0.20	0.23	0.15	0.33	0.12	0.43
Supervisors	0.16	0.24	-0.01	0.93	0.05	0.69
Tenure	0.02	0.74	0.04	0.48	0.02	0.67
Conscientiousness			0.01	0.89	0.02	0.81
Neuroticism			-0.26	0.00	-0.32	0.00
Openness			0.44	0.00	0.46	0.00
iODR					0.21	0.01
iODR*						
Conscientiousness					-0.11	0.22
iODR * Neuroticism					0.03	0.66
iODR * Openness					0.04	0.65
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Observation (351)						
Adjusted R ²	0.1		0.16		0.18	
F	F(7), 1.50, p = 0.17		F(10), 7.49, p<0.001		F(14), 6.29, p<0.001	

Note: *p<0.05; **P<0.001

1. Job status is dummy variable. Full time is coded as 1, part-time is coded as 0.
2. Supervisors are coded as 1. General staff is coded as 0.

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