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The value of being a conscientious learner
Examining the effects of the Big Five personality traits on self-reported learning from training

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Abstract
Purpose – The aim of this paper is to examine the impact of personality traits of the Big Five model on training outcomes to help explain variation in training effectiveness.

Design/methodology/approach – Associations of the Big Five with self-reported learning following training were tested in a pre- and post-design in a field sample of junior medical practitioners ($N = 99$), who attended a training workshop on self-awareness. Associations are reported of personality traits with post-training learning measured immediately following the workshop and one-month later controlling for pre-training learning.

Findings – Conscientiousness was related to post-training learning at both times. None of the remaining Big Five factors were associated with post-training learning.

Research limitations/implications – The study contributes to the literature on personality and training outcomes, clarifying the associations of traits with outcomes in a pre-and-post design. Although the study sample has limitations, the findings have implications for numerous lines of future research, in particular in understanding the role of training in relations of personality and job performance.

Practical implications – Practitioners should consider ways to encourage training participants to approach training conscientiously. Personality assessment might help people reflect on their approach to learning to adapt it during training.

Originality/value – No study has previously examined the role of personality traits in training outcomes using a pre- and post-design. The role of conscientiousness in workplace learning is underlined by the findings. While dimensions such as openness and extraversion may encourage people to participate in training, conscientiousness may make the difference in promoting internalized individual development and change following training.

Keywords Training, Personality, Conscientiousness, Big Five, Learning outcomes, Workplace development

Paper type Research paper

Introduction

How are personality traits associated with learning outcomes from training? While research has examined how individual differences influence training outcomes (Chen *et al.*, 2000; Brown, 2001), the absence of pre and post-measurement of learning criteria in such studies means that the role of personality traits in individual development and change is not fully understood. In the present study, we examine the associations of the Big Five on self-reported learning longitudinally, measuring learning before, immediately following and one-month after the training intervention. Our study contributes to the academic literature on individual differences and training at work, by examining the associations of personality with learning controlling for pre-training learning, within a field-study setting and has implications for future research in this area.

Personality traits, training and performance at work

Individual differences have been associated with training performance in several meta-analyses (Barrick and Mount, 1991; Colquitt *et al.*, 2000; Blume *et al.*, 2010). Personality traits have the potential to affect individuals' training proficiency because they can influence motivation, participation, attitudes and attention to training, which can all affect how much they learn (Gully and Chen, 2010). Studies based around the Big Five model (comprising Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness; Goldberg, 1990) have provided the most recent theoretical and empirical development of the literature. Blume *et al.* (2010) showed meta-analytic associations of Conscientiousness and Neuroticism with training transfer intentions. In a longitudinal study, Dean *et al.* (2006) reported that Conscientiousness, Openness and Extraversion predicted performance on simulation-based training outcome measures but not pencil-and-paper tests during the training program. Cullen *et al.* (2013) reported that Conscientiousness and Extraversion were correlated with post-training declarative and procedural learning under certain training conditions, indicating some "treatment effects" of the training delivery methodology.

To develop understanding of the relations of personality and training at work in context, it is informative to consider their role in promoting job performance. There is an extensive literature providing evidence of the associations of personality and job performance (Barrick and Mount, 1991; Salgado, 1997). Meta-analyses have consistently reported associations of dimensions of the Big Five with performance, most significantly Conscientiousness and Emotional Stability (Barrick and Mount, 1991). It has been proposed that Conscientiousness, in particular, is likely to be predictive of performance across all jobs in part because of its associations with contextual or organizational citizenship behaviour (Borman and Motowidlo, 1997). Contextual performance includes aspects such as conscientious initiative (talking responsibility to improve one's area of work; Woods, 2008 for a review), as well as helping colleagues and being committed to the organization's strategy and vision (Williams and Anderson, 1991).

Research on personality and job performance has also more recently considered how the impact of personality traits on job performance changes through people's tenure (Woods *et al.*, 2013). For example, in sales roles, Thoresen *et al.* (2004) reported that Openness and Agreeableness predicted performance in the transitional phase of employment, giving advantage for acquiring new knowledge and skills. These same

dimensions were less predictive of performance in the maintenance phase of tenure (once the job had been learned).

It is possible that the relations of personality and performance are in part reflective of the tendency of people with particular profiles of traits to be more motivated to learn. There is support for this proposition from theory and research in the literature. For example, Johnson (2003) proposed that a mechanism mediating the pathway of personality and performance was the acquisition of declarative and procedural skills. Indeed, McCloy et al. (1994) found that temperament dimensions (similar to personality traits) were associated with both declarative and procedural learning in the military. Moreover, personality is also associated with learning styles and approach to learning, having an impact on performance benefits (Chamorro-Premuzic and Furnham, 2008; Blickle, 1996). Most compellingly, Conscientiousness has also been found to be the strongest predictor among the Big Five of motivation to improve through learning, a construct which in turn is associated with a variety of performance outcomes (Naquin and Holton, 2002).

Processes of personality and performance are potentially important in clarifying the role of traits in influencing learning outcomes from training. The literature suggests that people who are, for example, high on Conscientiousness will typically seek to pro-actively learn more about their job to improve their performance (Naquin and Holton, 2002; Borman and Motowidlo, 1997). It is therefore more likely that they know more (i.e. have learned more skills relevant to their job) before undertaking training. Ignoring this pre-training learning is problematic because it is plausible that findings indicating associations of Conscientiousness and learning outcomes from training might rather reflect general work proficiency rather than greater acquisition of learning from training activity. If so, studies that examine the associations of personality with learning outcomes post-training may be confounded.

This is an acute issue in the workplace learning literature because although some studies of personality and training outcomes have used longitudinal designs, all measure learning criteria exclusively post-training. No studies to date have examined the associations of the Big Five with individual change resulting from training (i.e. by controlling for pre-training learning), an important gap in this literature. Our study addresses this gap by examining how the Big Five personality traits predict individual development and change from training. Specifically, we examine how personality traits are associated with changes in self-reported learning measured pre-training, immediately following training and one-month afterwards. Below, we describe theoretical and conceptual mechanisms that may underpin these associations and develop specific hypotheses.

Conscientiousness. Conscientiousness represents a person's orderliness, industriousness, self-discipline, achievement orientation and responsibility (DeYoung et al., 2007; Costa and McCrae, 1992). Conscientiousness has been associated with learning outcomes and training proficiency (Kim et al., 2012). People with high levels of Conscientiousness are likely to be more motivated to commit to training programs, develop stronger intentions to transfer learning (Yamkovenko and Holton, 2010) because they have a higher need for achievement than others and work harder during training because they are more industrious (Colquitt and Simmering, 1998). Those individuals are likely to gain more from training interventions than others, so our first hypothesis is:

H1. Conscientiousness will be positively associated with post-training learning, after controlling for pre-training learning.

Openness. Openness represents a person's degree of curiosity, creativity and preference for intellectual activity (Costa and McCrae, 1992). A number of studies have linked Openness to training performance (Gully *et al.*, 2002; Orvis *et al.*, 2010). People high in Openness are more likely to have positive attitudes towards learning because they are more broadminded and curious than others. They are consequently more likely to be motivated to learn in training situations (Gully and Chen, 2010). Our second hypothesis is therefore:

H2. Openness will be positively associated with post-training outcomes, after controlling for pre-training learning.

Extraversion. Extraversion concerns a person's degree of sociability and assertiveness (DeYoung *et al.*, 2007). A relationship between Extraversion and training performance has been supported by several studies (Major *et al.*, 2006; Orvis *et al.*, 2010). People with high levels of Extraversion are more confident in social situations, and therefore more likely to involve themselves in training activities that are frequently interpersonal in nature, involving group work and discussions. Consequently, our third hypothesis is:

H3. Extraversion will be positively associated with post-training outcomes, after controlling for pre-training learning.

Method
Participants and procedure
Participants were 99 trainee medical practitioners in their first six years of post-graduate training. They all worked in the UK NHS in the Yorkshire and Humber region, (67 per cent female; mean age = 28, range 22-51; 69 per cent spoke English as their first language).

All participants voluntarily attended a training program designed to improve self-awareness. Participants were recruited by e-mail flyer. The flyer offered participants the opportunity to complete an online survey about their personality and attitudes and then to attend a workshop on developing self-awareness to receive individualized feedback and explore the impact of their responses for work behaviour and career planning. Prior to the training, all participants completed an online questionnaire consisting of demographic questions and the personality assessment, plus some additional survey items not reported here.

Following completion of the survey, participants attended a half-day (three-hour) self-awareness session, consisting of presentations (i.e. lectures by the trainer), pair- and group-working activities and individual reflective activities. Feedback from the online personality assessments was given as part of the workshop in writing and explored through discussion. In workshop activities, participants reviewed the feedback and applied the information to help them reflect and be more aware of the impact of their working style and characteristics on different aspects of their work and performance (such as career planning, decision-making and negotiation skills).

Participants completed a questionnaire about their learning around self-awareness before the workshop commenced (Time 1) and another at the close of the workshop (Time 2). One-month after the workshop (Time 3), participants were contacted by e-mail

to complete an online survey containing the same items. As is common in longitudinal designs, there was sample attrition for the one-month follow-up. Of the initial sample, 43 participants completed the Time 3 survey. However, importantly for our study, independent samples *t*-tests revealed no significant differences in the personality traits of those that completed the Time 3 survey and those that did not. Moreover, these 43 participants were also highly comparable in terms of age and gender (67 per cent female; mean age $=$ 28 years).

Measures
Personality. Personality was measured using the NEO PI-R (Costa and McCrae, 1992), consisting of 240 items designed to measure the Big Five personality traits – Neuroticism ($\alpha = 0.92$), Extraversion ($\alpha = 0.89$), Openness ($\alpha = 0.89$), Agreeableness ($\alpha = 0.87$) and Conscientiousness ($\alpha = 0.91$).

Self-reported learning. Learning was measured using the same 20 items at all three time points (Appendix 1 for items) developed to reflect a range of elements relevant to the training, including knowledge and understanding around self-awareness, performance of behaviour drawing on self-awareness and motivation to continue to apply relevant learning. Items were rated on a ten-point Likert scale (e.g. I have developed the skills required to undertake effective self-reflection; $1 =$ strongly disagree, $10 =$ strongly agree). Although our sample did not permit factor analyses to be run, tests of internal consistency indicated acceptable reliability (Time 1 $\alpha = 0.90$; Time 2 $\alpha = 0.96$; Time 3 $\alpha = 0.92$).

Analyses
Following Dierdorff *et al.* (2010), we tested our hypotheses using regression analyses in which pre-training learning (Time 1) was entered as a predictor variable alongside the Big Five personality factors, with post-course outcomes (Time 2 and 3) entered as criteria. This enabled us to control for the effects of pre-training learning in our analyses of the associations of the Big Five and outcomes from training. Beta values for the Big Five in our regressions therefore represent variance explained in learning outcomes assuming pre-course learning to be held constant. Although we did not predict effects of Neuroticism or Agreeableness, we included all five of the Big Five dimensions in our regression models for completeness.

Results
Table I presents correlations between all the variables in the study and shows that, as expected, pre-training (Time 1) learning was significantly associated with learning measured at Time 2 and 3. Conscientiousness was significantly associated with learning at all three time points. Neuroticism was negatively related to pre-training (Time 1) learning.

In our regression models (Table II), when entered alongside the Big Five, pre-training learning predicted Time 2 learning (immediately after the training) but not learning measured at Time 3 (one month post-training). However, conscientiousness emerged as a significant predictor of Time 2 and 3 learning, after controlling for Time 1 learning (Time 2: $\beta = 0.31$, t (93) $= 3.20$, $p < 0.01$; Time 3: $\beta = 0.42$, t (39) $= 2.95$, $p < 0.01$). *H1* was therefore supported. None of the other personality traits emerged as significant predictors of learning measured at Time 2 or 3. *H2* and *H3* were therefore not supported.

Discussion

This study examined how personality traits of the Big Five model were associated with learning following a self-awareness training workshop. By measuring learning at three time points, we were able to examine personality trait associations with development and change as a result of the training. Our results showed that Conscientiousness was associated with self-reported learning after controlling for pre-course learning immediately following the training, and one-month after the training, supporting *H1*. Our results likely reflect the working style of people with higher levels of Conscientiousness. Associated traits of high Conscientiousness such as self-discipline, responsibility, dutifulness and industriousness are likely to lead people to be more motivated to commit to training and to work harder during workshops or training courses. People high on Conscientiousness may also feel a sense of responsibility or obligation to learn and develop from training if their employer has invested in the program, leading to more positive training outcomes. Our findings contribute to the literature on Conscientiousness and training outcomes by showing the association of this trait with individual development from training, including one-month after the training workshop in our sample.

Variables	Mean	SD	1	2	3	4	5	6	7
1. Pre-training learning (Time 1)	7.02	0.86	–						
2. Post-training learning (Time 2)	8.03	0.97	0.58**	–					
3. Post-training learning (Time 3)	7.99	0.83	0.51**	0.40*	–				
4. Neuroticism	89.93	21.51	−0.25*	−0.11	−0.23	–			
5. Extraversion	117.07	19.52	0.20	0.06	0.05	−0.35**	–		
6. Openness	120.15	17.43	0.12	0.07	0.20	−0.07	0.41**	–	
7. Agreeableness	125.75	14.90	−0.04	−0.00	−0.29	−0.12	0.20	0.20	–
8. Conscientiousness	121.38	18.23	0.35**	0.42**	0.60**	−0.27**	0.14	0.14	−0.14

Notes: *$p < 0.05$; **$p < 0.01$; for Time 1 × Time 2, $N = 99$; for Time 1/Time 2 × Time 3, $N = 43$; for Time 1/Time 2 × Big Five, $N = 93$; for Time 3 × Big Five, $N = 39$

Table I.
Means, standard deviations and correlations of all variables in study

Variables entered into regression	Post-training learning (Time 2; $n = 93$)		Post-training learning (Time 3; $n = 39$)	
	b	t	b	t
Pre-training learning	0.50	5.47**	0.19	1.21
Neuroticism	0.08	0.82	−0.15	−1.12
Extraversion	−0.12	−1.17	−0.24	−1.59
Openness	0.11	1.15	0.20	1.31
Agreeableness	0.07	0.81	−0.19	−1.49
Conscientiousness	0.31	3.20**	0.42	2.95**
R		0.64		0.66
R^2		0.41		0.43
Adjusted R^2		0.37		0.34
F		9.93**		4.47**

Note: **$p < 0.01$

Table II.
Standardised regression weights of personality traits and pre-training outcomes on post-training outcomes

We also hypothesized that Extraversion and Openness would be associated with learning, but, after controlling for pre-course learning, neither of these traits were associated with learning at Time 2 or 3. However, our null findings for Extraversion and Openness, when viewed alongside our methodology of controlling for pre-course learning, may shed new light on our understanding of the extent to which personality predicts differences in people's perceived internalized learning as a result of the training course. Whilst people high on Extraversion and Openness may be more receptive to new information and to participate actively in training (Gully and Chen, 2010), it may be Conscientiousness that makes the difference in terms of whether people are motivated to apply learning and develop and change as a result of training. Our study therefore underlines the need to encourage research in this area to focus more clearly on measurement of individual change as a result of training.

Implications for future research
We earlier considered the role of personality and learning from training in the context of relations of personality traits and job performance. Our findings, although based on a modest sample from one occupational group, present a number of avenues for future research and theorizing.

The literature on personality and performance points to the role of Conscientiousness in proactive learning to improve performance at work (Naquin and Holton, 2002; Borman and Motowidlo, 1997). This is potentially a mechanism that promotes acquisition of declarative and procedural skill (Johnson, 2003), in turn leading to performance improvement. Our findings complement understanding of these processes because by measuring pre-training learning, our results control for the potential confound that people high on Conscientiousness simply acquire more job-relevant skills of their own volition and therefore have higher pre- and post-training learning. In our sample, people high on Conscientiousness did report higher pre-training learning but, importantly, after controlling for this effect, reported higher levels of learning post-training and at follow-up. In sum, if replicated, this finding could represent a means by which Conscientiousness impacts performance at work in the long term. That is, conscientious people are not only generally more motivated to develop and learn at work but also potentially benefit more (i.e. learn more) when they are given training, providing a further performance boost.

We caveat these implications against the limitations of our sample and therefore call for research to extend our findings. Specifically research studies are needed to test the associations of personality traits with learning from training, controlling for pre-training learning in different contexts and different ways. There are five potential avenues of work. First, studies in different occupational contexts. Our study is in a medical context, but future studies could consider a range of professional and non-professional settings. Second, studies of different kinds of job skills and knowledge. In our study, development of self-awareness represents an aspect of general personal effectiveness, future studies could examine if results are comparable for more technical skills. This would also address the possibility that the findings are specific to self-awareness or more generalizable to wider skills and competencies. Third, future research should model learning outcomes in various ways, for example, comparing declarative and procedural knowledge or cognitive, skill-based and affective outcomes (Kraiger *et al.*, 1993). Fourth, studies could examine personality at facet-level using

different measures of personality (Woods and Anderson, 2016). Fifth, effects could be tested at different job stages. Of particular practical interest in this respect would be to understand the effects or traits on formal learning during transition stages (early in the job). This could contribute to the literature on recruitment and selection, providing evidence to explain the validity of personality assessment in selection (i.e. by identifying people with the traits that give an advantage for learning at the start of a new job role).

Our findings have implications for training practice. Although simply attending training may yield benefits for people at work, our findings underline that approaching training conscientiously results in more positive outcomes. Training practitioners may therefore consider ways in which they can foster individual's motivation to focus, commit and importantly to apply and internalize learning to promote development and change. Personality assessment may be a useful means of encouraging and helping people to think about their own approach to learning and possible ways to adapt it during training.

More widely, our findings also have implications for recruitment and selection. If our findings about Conscientiousness and learning from training were replicated and generalized across different occupations and learning outcome criteria, then there are obvious advantages for selecting highly conscientious recruits, especially where a high level of training is anticipated. Good examples are graduate recruitment or selection onto trainee schemes.

There are some limitations to highlight from our study. First, we must acknowledge that the sample for the study is small and specific in terms of being sourced from a medical context. However, our study methodology involved significant input with participants and so the data we collected from each participant were substantive in terms of quality and volume. Our findings must nevertheless be caveated against the limits of the sample and be seen as a first step in exploring the role of personality in learning from training in pre- and post-designs. In future studies, applying larger samples could enable further analyses, such as, for example, testing moderating effects on age or gender. Second, participants volunteered for the program, which could be relevant in respect of our findings for Openness. It is possible that people with higher Openness were more likely to volunteer for the training, thereby masking potential effects of this trait on training outcomes. A logical replication could examine the influence of personality on learning in non-voluntary training. A third limitation relates to the self-reported nature of the learning criterion measure. The training workshop in the present research focused on developing self-awareness and it therefore seems sensible to assume that an effective means of judging self-awareness is through self-perceptions of learning.

In the context of the literature our approach of controlling pre-training learning in examining the role of personality in training appears to represent an important step. We have to that end, notwithstanding these limitations, presented numerous directions for future research to pursue.

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Appendix

Self-reported learning scale items

I have a clear understanding of what is self-awareness

I am self-aware

I believe it is important to develop self-awareness

I am confident in my ability to develop my self-awareness

I have a clear understanding of what is self-reflection

I have developed the skills required to undertake effective self-reflection

I believe it is important to spend time reflecting

I am confident in my ability to undertake effective self-reflection

I have a clear understanding of my own working style

I have an understanding of different work styles

I take into consideration my own and others' styles when completing tasks or undertaking work

I believe it is important to take into account my own and others working style when undertaking work

I am confident in my ability to adapt my approach to work to different situations or tasks

I am able to adapt my working style when needed

I am aware of how my working style impacts on others

I am motivated to enhance my self-awareness

I have the confidence necessary for successful career development in my role

I have the motivation necessary for successful career development in my role

I have the self-awareness necessary for successful career development in my role

I have a good understanding of my strengths and weaknesses

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