

## INTERNATIONAL REPLICATION NOTE

# Openness to Experience as a Predictor of Job Performance Trajectories

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The present study used a longitudinal design to examine the relationship between openness to experience and 4-year job performance trajectories for a sample of 129 newly employed professionals. For the typical person, performance increases decelerated over time, plateaued at 2.93 years, and then started to decline thereafter. Openness was not significantly related to initial performance differences or the initial linear rate of growth in performance; however, the performance of individuals high on openness decelerated at a slower rate and started to decline at a later point in time than that of individuals low on openness. We discuss the implications of our findings for theories of job performance and for the use of openness measures in selection contexts.

## INTRODUCTION

Research on the predictors of job performance has often implicitly assumed that performance is a stable construct that varies little over time. However, longitudinal studies provide evidence for systematic patterns of within-person variability in job performance that can be accounted for by linear and quadratic growth parameters (e.g. Hofmann, Jacobs, & Baratta, 1993). Specifically, for the average person, performance initially increases linearly and then plateaus, thus following a learning curve. Furthermore, if performance is assessed over a long enough period it may eventually decline (e.g. Hofmann et al., 1993). These findings presumably reflect the effects of learning and changes in motivation that occur over time. In addition to the main effects of time, there are also significant differences between people in the rates at which performance increases, plateaus, and declines over time (Hofmann

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We thank Daniella Luppino for her assistance in the revision process.

et al., 1993). In response to such findings, there has been a call for greater use of dynamic performance criteria in assessing the utility of predictors over time (Steele-Johnson, Osburn, & Pieper, 2003), and, specifically, more research into the dispositional variables that predict individual differences in performance trajectories.

*Openness to experience* (one of the Big Five personality dimensions along with neuroticism, extraversion, agreeableness, and conscientiousness; see Costa & McCrae, 1992) is a dispositional variable that is likely to be relevant for predicting individual differences in the pattern of performance growth over time. This dimension is likely to influence performance trajectories through its effects on individuals' intrinsic motivation to learn. Although open individuals are not necessarily more capable than their less open counterparts, they are more likely to perform behaviours and display mind-sets that facilitate long-term knowledge and skill acquisition (e.g. Rolfhus & Ackerman, 1999). For example, compared to their less open colleagues, highly open individuals are more likely to explore their surroundings and to experiment with new ways of doing things (Costa & McCrae, 1992). Cognitively, they tend to be more imaginative, show a greater willingness to intellectually engage in tasks, and are more open to beliefs that do not adhere with their own points of view (see Costa & McCrae, 1992). Furthermore, highly open individuals are more likely to adopt a learning goal orientation, which, in turn, is associated with a highly adaptive pattern of responding that includes setting challenging goals, the use of more effective learning strategies, higher levels of effort and planning, and greater feedback seeking behaviour (e.g. Payne, Youngcourt, & Beaubien, 2007). Hence, although open individuals may not perform any better than their less open colleagues when first starting a job, over the long term their performance is likely to increase to a greater extent than less open individuals as they acquire a greater amount of job knowledge and respond more adaptively to their work experiences.

Only one previous study has examined the relationship between openness to experience and job performance trajectories. Thoresen, Bradley, Bliese, and Thoresen (2004) proposed that openness to experience would be positively related to linear performance increases for a sample of 48 sales representatives who had been reassigned to a new product launch and whose performance was tracked every 3 months over a year. The hypothesised effect was not statistically significant, however; at least two features of their research design could have contributed to the lack of support for the hypothesis. First, the small sample size limited the statistical power of the tests. Second, the sample did not satisfy strict definitions of being in a transitional stage (which they had identified as a precondition for the hypothesis) as the participants had not experienced a change in occupation, organisation, or industry.

Although Thoresen et al. (2004) did not obtain a significant relationship between openness and the *linear* component of performance growth, they found that openness was significantly related to the *quadratic* component of growth, and, as a result, concluded that the performance of the highly open salespeople was likely to plateau less rapidly than that of the less open salespeople. This finding had not been hypothesised by Thoresen et al. (2004); however, it is plausible that the effect is a meaningful representation of the way in which openness relates to performance trajectories. In accord with the *honeymoon effect* (Helmreich, Sawin, & Carsrud, 1986), personality differences are less likely to determine performance differences in the early stages of a job because the motivation to learn is largely induced externally by the novelty and challenge associated with starting the job. Thus, performance increases may initially occur at a similar rate regardless of the level of openness. However, with the passage of time the external motivating factors wane, and employees are likely to experience a *hangover effect* (Boswell, Boudreau, & Tichy, 2005) in which job satisfaction levels decline. To the extent that less satisfied workers are also less likely to perform well (see Judge, Thoresen, Bono, & Patton, 2001), this may account for the decline in performance after several years on the job that has been observed in some studies (e.g. Hofmann et al., 1993).

Moreover, declines in performance are likely to be particularly pronounced for individuals who are low on openness. These individuals typically have lower levels of intrinsic motivation to learn (e.g. Major, Turner, & Fletcher, 2006) and are therefore more likely to be adversely affected by reductions in external sources of motivation that occur as the novelty of the job wears off. In contrast, individuals high on openness have higher levels of intrinsic motivation, which, in turn, is associated with greater continuous learning efforts throughout one's career, not just in the initial stages of a job (see Watanabe, Tareq, & Kanazawa, 2011), and this may well provide the impetus for continued development and skill acquisition after several years on the job, which in turn may act as a buffer against decrements in performance over time. That is, to the extent that the opportunities for growth and self-development continue to be present within a job, individuals who are high on openness to experience are more likely to be intrinsically motivated to seek out these opportunities. These individuals continue to perform because unlike their less open colleagues, they continue to grow.

Other than Thoresen et al. (2004), we are not aware of any studies that have directly examined openness effects on job performance trajectories. However, some indirect support exists for such effects. For example, Tett, Jackson, and Rothstein's (1991) meta-analysis of the personality predictors of job performance found that openness was on average a positive predictor of performance; however, the results varied largely from sample to sample. Importantly, personality effects were stronger as a function of increasing job

tenure, which is consistent with the idea that highly open individuals will increasingly outperform their less open counterparts with the passage of time. Other studies (e.g. George & Zhou, 2001; LePine, Colquitt, & Erez, 2000) have shown that openness is related to several variables that are thought to be important for maintaining performance in transitional job stages, such as adaptability, creativity, and intellectual flexibility (see Thoresen et al., 2004).

The present study examines the relationship between openness to experience and job performance trajectories for a sample of employees of a large professional services company. Several features of the present research differ from those of the previous work by Thoresen et al. (2004). First, the employees were recent university graduates who had been hired by the company as part of the company's graduate recruitment programme. Consequently, the present sample better meets the definition of being in a transitional stage in that the participants were new to the organisation and the occupation. Second, performance was tracked over a period that was approximately four times longer than in the Thoresen et al. (2004) study, and this in turn provides greater opportunity for the long-term motivational effects of openness to emerge. Third, the present study involved a sample that was substantially larger than Thoresen et al.'s (2004) sample, and therefore provides more powerful tests of the hypothesised effects. Fourth, the two studies differ in the occupational group (salespeople versus consultants) and performance criterion (sales figures versus supervisor ratings) under consideration, which facilitates an assessment of the generalisability of the openness–performance trajectory relationship across the differing contexts.

Based on the above arguments, we propose that openness to experience will be associated with job performance trajectories. Specifically:

*Hypothesis:* The job performance of individuals high on openness will increase at a faster rate (linear effect) and decelerate and decline at a slower rate (quadratic effect) than that of individuals low on openness.

Finally, although the main focus of the present study was on the openness dimension of personality, we also included conscientiousness as part of the analyses. Thoresen et al. (2004) obtained null findings for the effects of conscientiousness on performance slopes; consequently, we did not derive hypotheses in relation to this dimension. However, given its well-established links with job performance (e.g. Barrick, Mount, & Judge, 2001) and intrinsic motivation (e.g. Hart, Stasson, Mahoney, & Story, 2007), we include conscientiousness in the present study to further explore its effects on performance trajectories and to control for any potential confounding effect on the openness–performance relationship.

## METHOD

### Participants and Procedure

The data for the present study were collected as part of a longitudinal study in a large Australian-based professional services company that had hired 228 recent university graduates. Upon joining the company they were provided with training relating to the firm's systems and procedures and the jobs that they would perform. They then provided consulting services to the firm's clients in the areas of corporate finance and accounting. Within 6 months of joining the company the graduates were mailed a packet consisting of a participant information statement and consent form, a reply-paid envelope, the personality questionnaire used in the present study, and other work-related questionnaires that were used as part of an unrelated study. The graduates were asked to participate in the research by completing the questionnaires and returning them to the researchers. They were assured that their responses would remain confidential. Of the 228 graduates, 129 participated in the present study (57% female; age:  $M = 23.12$ ,  $SD = 2.42$ ). Over the subsequent 4 years, the performance of each participant was formally appraised by the employee's supervisor, typically once (and occasionally twice) per year. Information obtained as part of the performance appraisals was used to operationalise job performance.

### Measures

*Openness to Experience and Conscientiousness.* The participants completed the Congruence Personality Scale-2 (CPS-2; Pryor & Taylor, 2000), which is a measure of the Big Five personality dimensions. Supporting evidence for the reliability and validity of the inventory can be found in the CPS-2 Professional Manual (Pryor & Taylor, 2000). Openness to experience is assessed with 15 behavioural and attitudinal statements that tap into the various facets of the construct (e.g. intellectual tendencies, aesthetic interests, imagination, openness to new activities, etc.). Similarly, conscientiousness is assessed with 15 items. All items are responded to on a 7-point scale ranging from 1 (labelled *Never*) to 7 (labelled *Always*). An overall score for each participant was obtained by summing the 15 items for each dimension (Openness:  $M = 73.14$ ,  $SD = 10.40$ , Cronbach's alpha = .82; Conscientiousness:  $M = 78.02$ ,  $SD = 9.27$ , Cronbach's alpha = .81).

*Job Performance and Length of Service.* As part of the company's performance appraisal system, each employee was rated by their supervisor on a single-item 5-point global performance scale ranging from *below expect-*

TABLE 1  
Results of the Hierarchical Linear Modelling Analyses

<i>Model and effect</i>	b	SE	95% CI	t
Average performance growth over time				
Intercept	3.109	0.030	3.050 : 3.168	101.99**
Linear growth	0.506	0.064	0.379 : 0.633	7.92**
Quadratic growth	-0.104	0.018	-0.140 : -0.068	-5.84**
Effect of openness to experience and conscientiousness on performance growth parameters				
Intercept	3.109	0.032	3.046 : 3.172	98.59**
Linear growth	0.506	0.064	0.379 : 0.633	7.87**
Quadratic growth	-0.105	0.017	-0.139 : -0.071	-5.42**
Openness × Intercept	0.001	0.003	-0.005 : 0.007	0.33
Openness × Linear	-0.005	0.006	-0.017 : 0.007	-1.63
Openness × Quadratic	0.003	0.001	0.001 : 0.005	2.46*
Conscientiousness × Intercept	0.001	0.004	-0.007 : 0.009	0.34
Conscientiousness × Linear	0.001	0.007	-0.013 : 0.015	0.19
Conscientiousness × Quadratic	-0.001	0.002	-0.003 : 0.005	-0.76

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

tations (scored as 1) to *exceptional* (scored as 5). Over 4 years, 494 performance ratings were collected ( $M = 3.49$ ,  $SD = .70$ ). For each performance rating we also recorded the amount of time (incremented in days and expressed in years) that had passed since the person had started working at the company.

## RESULTS

We employed hierarchical linear modelling using the HLM software package to analyse our data (see Raudenbush & Bryk, 2002). First, we partitioned variability in job performance into between-person and within-person components. Within-person variability in performance ratings ( $\sigma^2_{\text{within}} = 0.35$ ) accounted for 72 per cent of the total variability in performance and was approximately two and a half times larger than between-person variability in performance ( $\sigma^2_{\text{between}} = 0.14$ ). This indicates that the typical individual displayed substantial variability in performance over time.

Second, we modelled within-person variability in performance over time as a function of an intercept term and linear and quadratic growth terms, where time was operationalised in terms of the length of service. The intercept term was defined such that it corresponded to the performance rating obtained 6 months after joining the company, because this is approximately when most of the participants received their first performance review. The results of this analysis are presented in the top panel of Table 1. The linear growth term was

positive and statistically significant ( $b = 0.506$ ,  $t = 7.92$ ,  $p < .01$ ), whereas the quadratic growth term was negative and statistically significant ( $b = -0.104$ ,  $t = -5.84$ ,  $p < .01$ ). Together, the linear and quadratic growth components accounted for 40.2 per cent of the within-person variability in performance ratings. The regression equation indicates that, for the average person, performance increases decelerated over time, plateaued at 2.93 years, and then started to decline thereafter (the plateau level was determined by applying differential calculus to the regression equation to obtain the value of the x-axis at the turning point and then converting this value into length of service). Additionally, we found that model fit associated with allowing the linear slope to vary between people (deviance statistic = 897.99) was significantly improved compared to a model in which slopes are fixed (deviance = 933.46),  $\chi^2(2) = 35.47$ ,  $p < .01$ ; and that model fit associated with allowing both the linear and quadratic slope to vary (deviance = 865.09) was significantly better than only allowing linear slopes to vary (deviance = 897.99),  $\chi^2(3) = 32.90$ ,  $p < .01$ . This indicates that individuals differ in the linear rate at which their performance initially increases and in how quickly it decelerates and declines.

Third, to examine whether differences between people in performance trajectories can be accounted for by differences in openness to experience and/or conscientiousness, we modelled between-person variability in the growth parameters as a function of (grand-mean centred) openness and conscientiousness (see the bottom panel of Table 1). Openness was not significantly related to between-person variability in either the intercept term ( $b = 0.001$ ,  $t = 0.3$ ,  $p > .05$ ) or the linear growth term ( $b = -0.009$ ,  $t = -1.63$ ,  $p > .05$ ). Therefore, our findings do not suggest that high and low open individuals differed with respect to their initial levels of performance or their initial linear rate of increase in performance. However, openness had a significant effect on quadratic growth ( $b = 0.003$ ,  $t = 2.46$ ,  $p < .05$ ). To depict the nature of this effect, Figure 1 plots the estimated performance trajectories at different levels of openness. It can be seen that the level of deceleration and decrease in performance over time is more pronounced for individuals who score low on openness than for individuals who score high on openness. For example, at one standard deviation below the mean value of openness, job performance begins to decline after approximately 2.72 years on the job; in contrast, at one standard deviation above the mean value of openness, the decline in performance does not commence until 3.34 years on the job (approximately seven and a half months later).

Finally, we note that conscientiousness was not significantly related to the intercept term or the linear or quadratic growth parameters (intercept  $b = .001$ ,  $t = .34$ ; linear  $b = 0.001$ ,  $t = 0.19$ ; quadratic  $b = -.001$ ,  $t = -.76$ ).

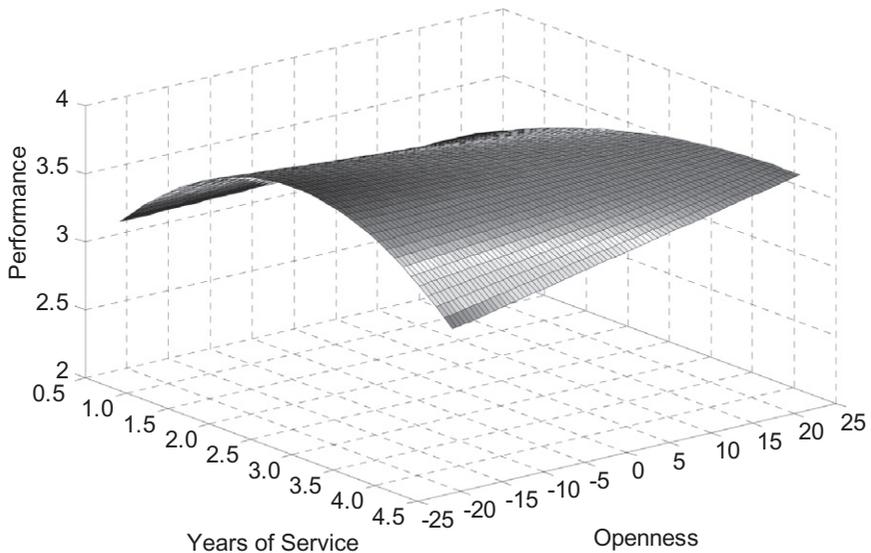


FIGURE 1. Job performance trajectories at different levels of openness to experience.

## DISCUSSION

With few exceptions (e.g. Thoresen et al., 2004), relatively little research has examined the noncognitive factors that account for individual differences in job performance trajectories. Our study contributes to this literature by implicating openness to experience as a relevant predictor of the rate at which performance decelerates and declines over time. This is an important finding because openness has previously been explicitly excluded from models of job performance due to its weak relationships with the traditional static measures of job performance (e.g. Barrick et al., 2001). The present results suggest that openness is a relevant dimension for explaining job performance outcomes; however, differences between individuals who are high versus low on openness may only emerge in the patterns of change over time (cf. Griffin & Hesketh, 2004).

A goal for future research will be to clarify the mechanisms through which long-term performance differences between individuals who are high or low on openness arise. The higher levels of learning orientation and motivation to learn associated with openness (e.g. Major et al., 2006; Payne et al., 2007) may be a possible mediating mechanism. Learning orientation focuses the individual on mastering tasks that are beneficial for long-term performance, even if at the expense of short-term results (Harris, Mowen, & Brown, 2005).

For these individuals, learning and acquisition of new knowledge and skills becomes a goal in itself, not simply performance. Alternatively, the quadratic openness effect may be mediated by regulatory goals. Vaughn, Baumann, and Klemann (2008) showed that highly open individuals are motivated to pursue promotion-related goals but not prevention-related goals. To the extent that promotion goals such as job advancement are less prominent when initially starting a job, but become more so with the passage of time, this may explain why openness predicts the quadratic component of performance growth but not the linear component. A future study that includes learning orientation and regulatory focus measures will shed further light on the mediating role of these constructs.

Furthermore, it is important to establish the extent of the generalisability of the quadratic effect of openness on performance growth. The present sample consisted of consultants operating in a relatively complex environment with ample opportunities for growth. The findings may not generalise to occupations that lack such growth opportunities. For example, Watanabe et al. (2011) recently obtained a significant effect of openness on intrinsic motivation for both car salespeople and systems engineers; however, intrinsic motivation only resulted in greater continuous learning for the latter (presumably more complex) occupation. Establishing the boundary conditions for the quadratic effect of openness is another important goal for future research.

From a practical perspective, our results indicate that measures of openness may be more useful for making personnel selection decisions than is suggested by previous null findings (e.g. Barrick et al., 2001), although the utility of openness scales will depend on the time scale under consideration. If an employer aims to select prospective employees who are likely to perform well in the short term, then openness is unlikely to discriminate between high and low performers. However, openness seems to have greater utility for selecting employees who are likely to perform well over the long term. In contrast, ability measures are more likely to show decreasing predictive validity as individuals gain experience with the job in question (see Murphy, 1989). Therefore, openness is likely to be a nonredundant predictor of performance even when a cognitive ability measure is available.

In contrast to openness, conscientiousness was not significantly related to performance trajectories in our study. This finding is consistent with that of Thoresen et al. (2004). However it is also surprising that conscientiousness was unrelated to initial levels of performance given the substantial evidence for the criterion-related validity of this factor (e.g. Barrick et al., 2001) and its links to intrinsic motivation. One possible reason for this relates to restriction of range. The participants were all university graduates who were selected into the company based partly on their performance at university. Furthermore, participation in our study was voluntary and required the person to

mail their questionnaire to us. Consequently, the participants are all likely to be at least moderately conscientious (in support of this, only one person scored below the midpoint of the conscientiousness scale).

We also note that our study was limited by the use of a single-item supervisor-rated measure of global performance, which is likely to be less reliable than multi-item measures. Nevertheless, single-item performance measures have been shown to correlate strongly with multi-item composites (e.g. Barrick & Mount, 1993; Cellar, Miller, Doverspike, & Klawnsky, 1996), which suggests that they may provide an adequate proxy for multi-item measures when the latter are not available. Supervisor ratings may also be prone to tenure-based expectation effects whereby individuals who have been at the company longer are rated more harshly due to higher expectations. This, however, seems not to have been the case in our data as performance ratings increased over the first three years. Finally, supervisor ratings may display range restriction in the initial stages of the job due to the fewer opportunities to observe employees (Tett et al., 1991). In our data, the standard deviation of performance ratings during the first year (.38) was lower than the overall standard deviation (.70), which may account for why openness and conscientiousness were unrelated to initial performance levels. Nevertheless, the consistency of our results with those of Thoresen et al. (2004) can be taken as evidence that the observed effect of openness on quadratic performance growth is not merely an artifact of using ratings to assess performance.

In conclusion, there has been a long history of examining personality–performance relationships at work; however, such studies have almost exclusively focused on static measures of performance. The present study demonstrates that important insights into the effects of personality can be gained by also considering dynamic measures of performance.

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