*Article*

# Comedians' Trait Level and Stage Personalities: Evidence for Goal-Directed Personality Adaptation

Personality and Social Psychology Bulletin
2020, Vol. 46(4) 590–602

DOI: 10.1177/0146167219867963
journals.sagepub.com/home/pspb
SAGE

**Paul Irwing[1], Clare Cook[2], Thomas V. Pollet[2], and David J. Hughes[1]**

**Abstract**

Recent findings have shown that both trait levels of personality and situational variability in its expression are of importance. So here, the Big Five personality traits of 77 professional and 125 amateur stand-up comedians were compared with two large matched samples ($N > 100{,}000$). The comedians were also observed while performing, which enabled a comparison of their stage personalities with situational requirements on 10 selected NEO-PIR facets. Both amateurs and professionals showed higher openness-to-experience, extraversion, and lower conscientiousness than their norm samples, while professionals also evidenced greater neuroticism. Irrespective of trait standing, with regard to most NEO-PIR facets, professionals expressed the appropriate on-stage persona and were better able to regulate their personality to conform to situational requirements than amateurs. This is consistent with research showing that individuals regulate their personality to conform to situational and goal requirements, and adds the finding that successful comedians demonstrate enhanced adaptability compared with amateurs.

**Keywords**

organizational behavior, personality, whole trait theory, comedians, invariance

Received October 24, 2018; revised accepted June 9, 2019

## Comedians' Trait Level and Stage Personalities

Personality has two major components: trait levels and moment-to-moment personality expression. In essence, these components mean that people have a typical level, of say Extraversion, but sometimes (perhaps often) deviate from this typical level. Both trait levels and personality expression are important for understanding human personality, especially within work or performance domains. Trait levels have received the most attention, but recent evidence suggests that around 65% of the variance in behavior is explained by moment-to-moment personality expression (or intra-individual variability), which is about twice that of variance attributable to trait levels (or inter-individual variation; Fleeson & Gallagher, 2009; Sherman, Rauthmann, Brown, Serfass, & Jones, 2015). Furthermore, growing evidence shows that intra-personal variability in personality expression is systematic and is related to situational characteristics (e.g., Fleeson & Law, 2015; Sherman et al., 2015) and current goals (e.g., Bleidorn, 2009; Heller, Komar, & Lee, 2007; McCabe & Fleeson, 2012; Perunovic, Heller, Ross, & Komar, 2011).

Building upon these observations, the current study seeks to examine both aspects of personality within a real-world, high-stakes occupational setting using comedians. Specifically, the study has two major goals. First is to examine the trait profiles of comedians, and to examine if and how they differ from the general population. Second, we seek to examine whether both professionals and amateurs adapt/change their personality expression when on stage and whether such adaptations are associated with performance levels. Comedians were chosen because evidence suggests that they are likely to have a unique profile of personality trait levels, and also because the demands of their role vary between writing and performing. In addition, although comedic performances are somewhat contrived (like any

[1]The University of Manchester, UK
[2]Northumbria University, Newcastle Upon Tyne, UK

**Corresponding Author:**
Paul Irwing, Alliance Manchester Business School, The University of Manchester, Room 7.005, Booth Street West, Manchester M15 6PB, UK.
Email: paul.irwing@mbs.ac.uk

employee giving a presentation), they do constitute a part of the job role which is relatively short, easily observable, and thus highly amenable to study.

## Personality Trait Profiles

First, we explore the personality trait profiles of amateur and professional comedians as compared with two very large matched samples. Why should comedians' trait level personalities differ from those of the general population? Perhaps one of the most useful frameworks to explain this is Roberts's (2006) ASTMA (Attrition-Selection-Transformation-Manipulation-Attrition) model.[1] Roberts reviews evidence that personality shows both stability and change over the lifespan, and argues that person-job transactions might influence both through five mechanisms. Persons are (1) attracted into and (2) selected for occupations which fit their personality; (3) in the course of performing their job role, people's personalities are transformed in a direction which conforms with its demands; (4) they manipulate their environment to better fit their personality, sometimes known as job crafting (Sutin & Costa, 2010; Wrzesniewski & Dutton, 2001); and (5) they leave jobs which do not fit their personality, a phenomenon denoted as attrition (Denissen, Ulferts, Ludtke, Muck, & Gerstorf, 2014).

The ASTMA transactions suggest that employment typically acts to entrench employees' existing trait profiles, because they are attracted and selected into roles that "fit" their personality, and are subsequently exposed to situations which reinforce these trait levels. However, work experiences can also "transform" personality. A number of theories elaborate on the reasons for transformation of personality. However, TESSERA arguably offers the most comprehensive framework (Wrzus & Roberts, 2017). "The . . . TESSERA framework posits that long-term personality development occurs due to repeated short-term, situational processes. These short-term processes can be generalized as a recursive sequence of Triggering situations, Expectancy, States/State expressions, and Reactions (TESSERA)" (Wrzus & Roberts, 2017, p. 253). In other words, carrying out any job role will repeatedly expose one to a range of job-specific situations with their associated expectancies, states, and reactions. If such situations require repeated expression of personality states at odds with one's trait levels of personality, personality will likely change in a direction consistent with occupational requirements. In sum, the above processes of personality development should shape job incumbents' personalities in a direction which tends toward person–environment fit (Woods, Wille, Wu, Lievens, & de Fruyt, 2019).

What evidence is there then that different occupations are associated with distinctive and homogeneous personality profiles? There are relatively few investigations directly relevant to this question (Bradley-Geist & Landis, 2012; Denissen et al., 2014; Jordan, Herriot, & Chalmers, 1991; King et al., 2017; Ployhart, Weekley, & Baughman, 2006; Satterwhite, Fleenor, Braddy, Feldman, & Hoopes, 2009; Schaubroeck, Ganster, & Jones, 1998), and although they all support the basic contention, they do so to different degrees. For example, King et al. (2017), in one of the larger and more comprehensive studies, found that variance due to occupational grouping was small and accounted for 4%, 6%, and 3% of the total variance in neuroticism, extraversion, and conscientiousness, respectively. In contrast, Denissen et al. (2014), in a similarly large study, reported correlations between ratings of required personality and averaged occupational personality profiles of .57, .54, and .69 for Extraversion, Agreeableness, and Openness, which suggests strong support for homogeneity of personality within occupations. It is not clear why findings are so discrepant, even with regard to extraversion, the only personality dimension common to these two studies, and it is possible as argued by Schmidt and Oh (2010), on the basis of extensive research (e.g., Schmidt & Hunter, 1998; Schmidt, Shaffer, & Oh, 2008), that for many jobs, there is little discrimination in personality requirements.

## Personality Trait Profiles of Comedians

Let us suppose for the moment that comedy is one profession which requires a distinctive personality profile to achieve success. What does that profile look like? To address this question, we adopt the Five-Factor Model (FFM), which, although criticized on both theoretical and methodological grounds (e.g., Block, 1995; Paunonen & Jackson, 2000), remains the consensus model of personality and possesses numerous advantages, especially the large reference databases pertaining to it (see John, Naumann, & Soto, 2008; McCrae & Costa, 2008; Miller & Lynam, 2015).

For the majority in the United Kingdom, the job of stand-up comedians is comprised of two major tasks: writing material and performing. Feist (1998) provides a meta-analysis relevant to the likely personality profiles of "creative artists" who write as part of their occupation. Feist compared the personality profiles of creative artists/writers and non-artists. Following Cohen's (1988) suggestion that *d* scores of around .20 represent small effects, .50 moderate effects, and .80 large effects, Feist (1998) found that artists were strongly less conscientious and moderately more open, and showed small tendencies to be more neurotic, extraverted, and disagreeable than non-artists. However, Silvia, Kaufman, Reiter-Palmon, and Wigert (2011) recently showed that agreeableness has a near zero correlation with creativity, and that previous studies have probably used measures which confound disagreeableness with immodesty, and should not, therefore, be relied on. Furthermore, Feist found, using the Creative Personality Inventory, that creative artists were more impulsive, nonconformist, rule-doubting, skeptical, and independent (all effects medium-large). Creativity is defined as generating novel ideas (Hughes, Lee, Tian, Newman, & Legood, 2018) for which openness to ideas would appear to be a prerequisite,

and indeed openness-to-experience has been the most consistent correlate of creativity (Kaufman et al., 2014; Silvia et al., 2011). In addition, to be novel often requires a rule-breaking mentality, and those with a propensity to create humor tend to be somewhat low in deference (Thorson & Powell, 1993). So, the comparative openness and low conscientiousness of creative artists is understandable in these terms, as well as consistent with the evidence.

Of relevance to the presenting aspects of stand-up comedy is a small study by Nettle (2006) of the personality characteristics of actors. Although comedy and acting differ, they share the requirement for presenting. Nettle compared 191 actors with a norm sample, and found *d* score differences of .02 for conscientiousness, .62 for openness-to-experience, .20 for neuroticism, .60 for extraversion, and .41 for agreeableness. As compared with creative artists, presenters share high openness, are similar in terms of a weak tendency to neuroticism, but are substantially more agreeable, extraverted, and conscientious. On this basis, comedians should be high on openness-to-experience as this characteristic is common to both their roles. Otherwise, their characteristics will depend on how the conflicting demands of writing and presenting balance out. Likely, low conscientiousness predominates because of the necessity of a rule breaking mentality to generate sufficiently interesting material. In terms of the remaining characteristics, if we assume that the effects of stage performance are relatively weak, given its short duration, then comedians should be mildly neurotic, somewhat more extraverted, and about the same in agreeableness compared with the normal population.

Most studies that have investigated comedians' personality traits directly suggest that comedians exhibit high levels of neuroticism (Fisher & Fisher, 1981; Janus, 1975; Janus, Bess, & Janus, 1978). These studies use psychometrically weak projective measures, and rely on small samples, which renders their findings questionable. However, the conclusion that comedians are neurotic is reinforced by a large scale study ($N = 523$) by Ando, Claridge, and Clark (2014). In a comparison of comedians with actors ($N = 350$), they found a *d* score difference of .51 for bi-polar traits and .35 for schizotypy. Overall, these studies suggest that neuroticism is a core characteristic of comedians.

Greengross and Miller (2009) is the only study which has used the FFM to investigate comedians' personality traits. They compared professional ($N = 31$) and amateur ($N = 9$) comedians with humor writers ($N = 10$) and college students ($N = 400$) using self-report NEO-FFI-R scores. In line with our theorizing, comedians of both groups showed significantly higher openness and lower conscientiousness compared with the students. Yet, they also showed lower extraversion and agreeableness, while no significant difference was found on neuroticism. No significant difference was found between amateur and professional comedians on any trait. However, the size of Greengross and Miller's comedian samples was very small and students represent a questionable norm group. Thus, investigation of the five factors in a larger comedian sample, in comparison with a representative general population group, is needed before firm conclusions can be drawn.

The first aim of this study is to build on Greengross and Miller's (2009) findings while addressing some of its limitations. Specifically, we explore the FFM personality characteristics of amateur and professional comedians, in comparison with two matched U.K. samples, utilizing self-report measures. The norm samples were substantially larger than those of all previous studies, as were the comedian samples, with the exception of the study of Ando et al. (2014). Based on our consideration of Feist's (1998) meta-analysis, Nettle's (2006) study of performers, together with direct studies of comedians' personality, we expected comedians will score lower on conscientiousness and higher on openness, while the preponderance of evidence points to elevated levels of neuroticism and extraversion and similar levels of agreeableness compared with the general population, given that previous investigations likely used a confounded measure of agreeableness (Silvia et al., 2011).

In a further refinement on previous work, we take advantage of methodological advances which offer more comprehensive and reliable analyses for investigating group differences. Collectively, Multi-Group Covariance and Mean Structures Analysis (MG-CMSA) adopts structural equation modeling to test for equivalence of the covariance structure within a given measure, and uses this robust structure to compare latent mean differences in the target constructs (Dolan & Molenaar, 1994). Measurement invariance tests the assumption that the construct is measured equivalently across groups. Most commonly, the pattern of factor loadings (configural), degree of factor loadings (metric), and the intercepts of indicators (scalar) are assessed for invariance (Widaman & Reise, 1997). Only if invariance holds, can precise estimates of group mean differences be calculated (French & Finch, 2006; Meredith, 1993). Finch and West (1997) suggest that tests of invariance are an important step forward in personality research and assessment of group differences. This is the first study to apply this methodology to comedians' personality.

In addition, we were able to control for three known confounds which would certainly have affected our estimates, namely, age, gender, and country of residence. It is well established that personality varies across gender (e.g., Del Giudice, Booth, & Irwing, 2012), age (Roberts, Walton, & Viechtbauer, 2006), and country of residence (Allik et al., 2017), and the population of comedians differs from the general population with respect to all three (Chortle, 2019). Because we had a very large comparison group, we were able to select a large number of exact matches (on age, gender, and country of residence) to each member of the comedian groups. Under these circumstances, exact matching is a preferable strategy to propensity score matching (Rosenbaum & Rubin, 1983).

### Adaptiveness of Comedians' Stage Personalities

Because standup comedians have to perform the material they write, they often find themselves adopting a persona that, in many cases, differs significantly from their everyday personality. For example, comedians often express rage or confusion to entertain and elicit emotional reactions from their audience. From one perspective, expressing a set of personality states at odds with trait levels might be considered a unique feature of the comedians' role. However, recent research suggests that most people actually shift their personality expression across situations, usually to match situational requirements and to aid goal attainment. Accordingly, we assess whether comedians shift their personality when on stage and, if so, whether this aids performance.

As we noted in the introduction, recent empirical evidence and theoretical developments (Fleeson & Jayawickreme, 2015) emphasize the importance of assessing personality trait levels and personality expression on the same dimensions (Fleeson, 2001). A series of studies using experience sampling methods have shown that intra-individual variability in personality expression accounts for about 65% of variance in behavior, with 35% of variance attributable to inter-individual variation (Fleeson & Gallagher, 2009; Sherman et al., 2015). Some of the most interesting findings in this domain revolve around density distributions of moment-to-moment personality expression (i.e., the distribution of expressed levels of say, conscientiousness). Notably, density distributions have been found to be stable. Correcting Fleeson's (2001) stability estimates, using the Spearman–Brown formula, shows average reliabilities for mean personality expression (i.e., level of a trait expressed) of .97 and for the standard deviation (i.e., the amount of variation in trait expression) of .85 across the Big Five factors.[2] Thus, variability in personality expression is a consistent feature of an individuals' personality.

The stability of variation in personality expression can also be explained by examining the role of situations and goals. Specifically, a considerable body of evidence shows that that intra-personal variability in state personality is situation dependent (e.g., Fleeson & Law, 2015; Sherman et al., 2015) and that personality states covary with current goals (e.g., Bleidorn, 2009; Heller et al., 2007; McCabe & Fleeson, 2012; Perunovic et al., 2011). Such evidence is in line with social cognitive theory (e.g., Bandura, 1997; Mischel & Shoda, 1995) in that variation in personality expression appears to result, at least in part, from person-situation transactions mediated by interpretive processes and motivational processes (goals and expectancies).

A perhaps more puzzling issue is that some investigations seem to show that variability in personality states can be dysfunctional (Clifton & Kuper, 2011; Côté, Moskowitz, & Zuroff, 2012; Fournier, Moskowitz, & Zuroff, 2009; Russell, Moskowitz, Zuroff, Sookman, & Paris, 2007; Zeigler-Hill et al., 2013), while others show that it can be functional (Lievens et al., 2018; Minbashian, Wood, & Beckmann, 2010). Here, we suggest a possible approach to resolving this paradox. Earlier in this article, we considered evidence that particular personality profiles provide a fit to different jobs such that persons with such profiles achieve greater success within the job. We infer that this is based on the proposition that their personality is adaptive for the range of situations they are likely to encounter within their job-role. Implicit in this framework is that success in any given situation is dependent on expressing a personality profile which fits the situation. It would follow that those who consistently express the personality profile needed to achieve success in each situation will be more successful than those who are unable to match situational requirements. It is possible then that those who are able to regulate their expression of personality to match situational requirements are adaptive, while those who show inappropriate variation of personality expression are not.

Following this logic, we examine whether comedians do indeed shift their personality when on stage, whether any shifts appear to be goal-directed, and whether professionals are better able to shift than amateurs. In assessing this, we propose that the match between expert ratings of the personality requirements for success in a situation and expressed personality will provide a suitable measure of adaptive personality expression. By definition, our sample of professional comedians has achieved greater success than the amateur or would-be comedians. We, therefore, predict that their expression of personality on stage will correspond more closely to expert ratings of situational requirements than is true for amateurs, and that this will be true across the range of personality states in which they differ. We investigate this issue using behavioral ratings of video recordings of stage performances in a high-stakes setting, that is, one of the premier U.K. venues for stand-up comedy. In doing so, we meet the call of Baumeister, Vohs, and Funder (2007) for studying "actual" behavior.

## Method

### Participants

Comedians were recruited through a live comedy venue, which is widely regarded as one of the two preeminent U.K. comedy establishments. Professional comedians were employed to perform at professional shows, were testing new material at a "new material" show, or were the master of ceremonies at an amateur night. Amateur comedians either performed in a "gong show" or worked, unpaid, at a professional show. Both groups were operating in a high-stakes situation, the professionals to further their career and the amateurs to establish one. The sample comprised 77 professional comedians (67 males, 10 females; $M$ age = 35.8, $SD$ = 7.8) and 125 amateur comedians (107 males, 18 females; $M$ age = 28.7, $SD$ = 8.1). The proportion of female comediennes in our sample at 13.9% is smaller than the 27.4% of female circuit

comediennes (Chortle, 2019). Among the amateur comedians, 21.6% had a postgraduate university education, 35.2% had undergraduate university education, 17.6% had non-university higher education, 11.2% had secondary school education to age 18, and 14.4% had secondary school education to age 16 as their highest level of education. Among the professional comedians, 29.9% had a postgraduate university education, 33.8% had undergraduate university education, 13.0% had non-university higher education, 9.1% had secondary school education to age 18, and 14.3% had secondary school education to age 16 as their highest level of education. The sample size was limited by practical considerations, although the multi-group confirmatory factor analysis (CFA) has adequate power due to the equality constraints imposed (see below). The two separate comparison groups for amateur and professional comedians were drawn from a general population sample of 333,442 U.K. residents, collected through multiple studies and provided by Samuel Gosling.

### Procedure

Comedians were approached via email by the club's general manager and/or in person on the night of their performance. Participants completed the Big Five Inventory (BFI). All, except gong show participants, completed the questionnaire on the night of their performance in the comedy club dressing room. Gong show participants were emailed the questionnaire, which they completed within 2 weeks of their performance.[3] Participants consented to have their performance recorded by the comedy club. Due to technical failures, 24 of these recordings were not available for analysis.

With the comedians' agreement, two experts viewed and rated a 5-min sample of their videoed performance. However, for gong show comedians, the sample period only lasted until they were "gonged." The experts were an internationally successful comedian and the comedy club's Technical Director.

### Measures

*Self-reported personality.* The BFI (John & Srivastava, 1999) comprises 44 items assessing extraversion, neuroticism, openness, conscientiousness, and agreeability. Participants respond using a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). The BFI demonstrates strong internal consistency ($\alpha \approx .83$), a clear factor structure, and convergence with other Big Five measures (John & Srivastava, 1999). In the current study, Cronbach's alpha reliabilities ranged from .74 to .84 with an average of .80.

*Behavioral observation.* Ten comedy-relevant facets of personality formed the basis of the observation. They included four facets of neuroticism: one each of extraversion and openness, two of agreeableness, and two of conscientiousness (see Table 2). To identify these, interviews were run with two comedians. The 30 NEO-PIR facets (Costa & McCrae, 1992) were described to interviewees. In response to each, interviewees were asked to indicate if the facet (a) is observable when comedians perform, (b) impacts comedians' effectiveness, and in line with the possibility that personality variability is a necessity for performing successful stand-up comedy, (c) requires variation across performances. Twelve facets met all criteria according to both interviewees. These were Angry Hostility, Straightforwardness, Self-Consciousness, Assertiveness, Ideas, Compliance, Self-Discipline, Anxiety, Deliberation, Impulsiveness, Activity, and Gregariousness.

Next, descriptions of the 12 facets were paired with a 5-point response scale (1 = *to a great extent*, 5 = *not at all*). They were then presented to 12 further industry experts, via an online survey, who were asked to indicate the extent to which each requires variation across performances. Experts had multiple roles in the comedy industry including comedy club manager/director, reviewer, headline comedian, agent, television comedy producer, promoter, and a festival director. Out of the 12 presented facets, the 10 which required the most variation across performances were selected for inclusion in the study. On this basis, Activity and Gregariousness were excluded.

For the observational study, the poles of each facet were defined and combined with a 10-point scale where 1 denoted *the low end of the facet* and 10 denoted *the high end*. Each facet along with its response scale was presented twice. In response to the first, the two experts were asked to indicate the level that was needed for comedians, to achieve as high a level of success as possible, due to their performance. In response to the second, they rated the comedians' expressed behavior in relation to the facet. The reliability of the mean ratings of situational requirements with respect to the 10 facets was .86 across the two sets of expert ratings. To control for the possibility that requiring the two experts to rate both required and observed behavior may have created a method artifact, we obtained a further sample of 11 professional comedians who provided independent ratings of required behavior. The means of the two sets of ratings correlated at .99. As the original ratings were recorded immediately after watching the videos of stage performances (about 180 times), and were, therefore, not subject to biases due to reliance on memory, we used these ratings in subsequent analysis.

## Results

Amateur and professional comedians were exactly matched on gender and age to cases from the reference sample of U.K. citizens. This was done via the "Matchit" algorithm (Ho, Imai, King, & Stuart, 2011) in R 3.4.1 (R Development Core Team, 2008). It led to the matching of 126,905 reference participants to 77 professional comedians and to 191,631 reference participants to 125 amateur comedians.

**Table 1.** Tests of Invariance Between the Respective Norm Groups, and the Samples of Professional and Amateur Comedians.

| Model | $\chi^2$ | *df* | CFI | ΔCFI | RMSEA | ΔRMSEA | TLI |
|---|---|---|---|---|---|---|---|
| Professional | | | | | | | |
| Configural | 146,240.2 | 1,515 | .934 | | .039 | | .918 |
| Metric | 62,347.1 | 1,710 | .972 | .038 | .024 | —.015 | .969 |
| Scalar | 60,422.8 | 1,794 | .973 | .001 | .023 | —.001 | .972 |
| Amateur | | | | | | | |
| Configural | 277,994.4 | 1,515 | .916 | | .044 | | .895 |
| Metric | 112,181.8 | 1,710 | .967 | .051 | .026 | —.018 | .963 |
| Scalar | 107,401.3 | 1,794 | .968 | .001 | .025 | —.001 | .966 |

*Note.* CFI = comparative fit index; RMSEA = root mean square error of approximation; TLI = Tucker–Lewis index.

**Table 2.** Mean Cohen's *d*-Scores on the Big Five Inventory for Amateur and Professional Comedians in Comparison With Their Respective Norm Samples.

| Personality factor | Norm group[a] | Amateurs | Professionals |
|---|---|---|---|
| Neuroticism | 0 | .09 [−0.10, 0.27] | **.47 [0.23, 0.71]** |
| Extraversion | 0 | **.51 [0.32, 0.69]** | **.28 [0.07, 0.48]** |
| Openness-to-experience | 0 | **.54 [0.34, 0.75]** | **.59 [0.25, 0.93]** |
| Agreeableness | 0 | .07 [−0.14, 0.26] | .12 [−0.13, 0.37] |
| Conscientiousness | 0 | **—.26 [−0.46, −0.06]** | **—.38 [−0.61, −0.14]** |

*Note.* SEM = structural equation modeling.
[a]When means are estimated from a scalar invariant SEM analyses, the means of one group must be set at 0 for the model to be identified. Ninety-five percent confidence intervals are shown in brackets, and mean differences significant at the .05 level are shown in bold.

We then tested for mean differences in BFI scores for professional and amateur comedians, separately, in comparison with their respective norm groups using MG-CMSA in Mplus. Because it is well established that the BFI does not provide a good fit using conventional CFA (Booth & Hughes, 2014), and the fit of a CFA to the total sample of comedians was poor, $\chi^2(194) = 511{,}417.9$, $p < .001$; comparative fit index (CFI) = .789; Tucker–Lewis index (TLI) = .775; root mean square error of approximation (RMSEA) = .076 [0.076, 0.076], we used multi-group exploratory structural equation modeling (MG-ESEM).

For group comparisons to be valid, scalar invariance must hold (Little, 2013). We considered good model fit to be indicated by values within the range of ≤.06 to .08 for the RMSEA, and ≥.90 to .95 for the TLI and CFI (Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Muller, 2003). We tested for measurement invariance in the order: (a) configural invariance, (b) metric invariance, and (c) scalar invariance using procedures recommended by Millsap and Kim (2018) adapted for the ESEM framework. Decline in model fit at a given stage of the invariance analysis indicates that the assumptions of invariance do not hold in the constrained parameters (French & Finch, 2006). To assess possible decline in model fit, we rely on the conclusions of a simulation study by Chen (2007). Her primary recommendation, when sample sizes are 500 or more, is that changes of equal to or less than −.01 for CFI and increases less than or equal to .015 for the RMSEA indicate that invariance holds.

In this instance, according to both criteria, and for both sets of analyses, increasingly restrictive models showed improved rather than reduced fit, and the scalar models showed excellent absolute fit which provides unambiguous support for scalar invariance (see Table 1). All salient item loadings were significant at $p < .001$, and barring three items were in the range 0.50 to 0.87 (see Supplementary Material Tables 1 and 2). The average variance extracted (AVE) for each factor ranged from 28% to 49%. Given that scalar invariance is convincingly demonstrated and that each of the factors is reliable (McDonald's Omega ranges from .78 to .89; see Supplementary Material Tables 1 and 2), it follows that the mean differences between groups are on the same measurement scale and are substantively interpretable.

The mean differences between groups are shown in Table 2 in the form of Cohen's *d* scores, with 95% confidence intervals. Cohen (1988) suggested that *d* scores should be considered small, medium, and large, at levels of .2, .5, and .8, respectively. However, he also cautioned that uncritical use of such arbitrary guidelines is dangerous. Nevertheless, according to these guidelines, in terms of neuroticism, amateurs were indistinguishable from the normal population, while professionals, as expected, showed a medium level of neuroticism. Amateur comedians are more extraverted, to a medium degree, than the normal population while professionals show only a

**Table 3.** Mean Scores on the 10 Comedy Relevant Facets of Personality: Optimum Scores and the Expert Ratings of Amateur and Professional Comedians in Performance, With and Without Age as a Covariate.

| | | No covariate | | Age covariate | |
|---|---|---|---|---|---|
| | Optimum | Amateur | Professional | Amateur | Professional |
| Neuroticism | | | | | |
| 1. Angry hostility | 3.63 | 4.00 [3.71, 4.30] | 4.12 [3.75, 4.49] | 4.08 [3.78, 4.38] | 4.01 [3.62, 4.39] |
| 2. Self-consciousness | 2.61 | **4.54 [4.20, 4.87]** | **3.25 [2.84, 3.68]** | **4.46 [4.11, 4.81]** | **3.38 [2.93, 3.82]** |
| 3. Anxiety | 3.04 | **5.33 [4.98, 5.68]** | **3.79 [3.35, 4.22]** | **5.30 [4.93, 5.66]** | **3.83 [3.37, 4.30]** |
| 4. Impulsiveness | 3.42 | 5.75 [5.37, 4.66] | 5.26 [4.79, 5.73] | 5.75 [5.36, 6.13] | 5.27 [4.78, 5.76] |
| Extraversion | | | | | |
| 5. Assertiveness | 7.58 | **5.57 [5.20, 5.95]** | **7.17 [6.70, 7.63]** | **5.76 [5.40, 6.12]** | **6.84 [6.37, 7.30]** |
| Openness | | | | | |
| 6. Intellectual curiosity | 7.56 | **4.32 [3.99, 4.65]** | **5.68 [5.28, 6.09]** | **4.32 [4.00, 4.65]** | **5.74 [5.32, 6.16]** |
| Agreeableness | | | | | |
| 7. Straightforwardness | 4.50 | 5.83 [5.53, 6.13] | 5.38 [5.02, 5.75] | 5.73 [5.44, 6.03] | 5.49 [5.11, 5.87] |
| 8. Compliance | 4.66 | **5.84 [5.46, 6.23]** | **4.78 [4.30, 5.25]** | 5.62 [5.25, 5.99] | 5.18 [4.70, 5.65] |
| Conscientiousness | | | | | |
| 9. Self-discipline | 7.01 | 6.55 [6.19, 6.90] | 6.75 [6.32, 7.19] | 6.63 [6.28, 6.98] | 6.66 [6.21, 7.11] |
| 10. Deliberation | 4.59 | **6.15 [5.79, 6.51]** | **5.28 [4.84, 5.73]** | 6.06 [5.71, 6.42] | 5.43 [4.97, 5.89] |

*Note.* All scores are on a scale from 1 to 10. Amateur $N = 112$, Professional $N = 71$. Ninety-five percent confidence intervals are in brackets. Mean differences between professional and amateur comedians significant at the 95% level are shown in bold.

small trend in this direction. Both amateurs and professionals showed moderately higher levels of openness than the normal population, and neither are distinguishable from the normal population with respect to agreeableness. Finally, both groups are less conscientious than the normal population to a medium degree. Although point estimates show that professionals are markedly more neurotic than amateurs, amateurs are somewhat more extraverted, and professionals are less conscientious, none of these differences achieve significance, probably because of a lack of power.

The heightened level of neuroticism and openness and low conscientiousness of professional comedians conforms to previous studies (e.g., Feist, 1998; Greengross & Miller, 2009). Equally, that professionals differ only weakly from the normal population in terms of extraversion and are indistinguishable in terms of agreeableness is consistent with our expectations. In addition, the moderately high level of openness demonstrated by professional comedians fits with the requirements of the job according to our two experts (see Table 3).

If we compare the mean level personality of professional comedians with the requirements of the job as judged by our experts (see Table 3), they are too high in neuroticism; are too low in extraversion; met with requirements with respect to openness and agreeableness; and are somewhat deficient in conscientiousness.

Our second set of analyses concerned the extent to which behavioral ratings of the 10 facets of expressed personality, described previously, matched the expert ratings of required stage personality depending on whether the participants were amateur or professional (see Table 3). Specifically, we expected that the expressed stage personalities of professional comedians would conform more closely to the personality requirements of successful stage performance as rated by experts, than is true of amateurs. We tested this proposition by conducting a multivariate analysis of variance (MANOVA), in SPSS version 23.0, using professional versus amateur status as the categorical independent variable and the 10 personality facets chosen from the FFM as dependent variables. We used multiple imputation as 10.38% of cases would have been lost with casewise deletion (see Supplemental Material Section 2). Using Pillai's Trace as the multivariate criterion, we found a significant main effect of professional versus amateur status on the 10 FFM facets ($V = .245, F = 5.58, df_1 = 10, df_2 = 16\text{-}72, p < .001$). Thus,

the discriminant variate explained 24.5% of the total variance. To explore further which personality variables explained the differences between amateur and professional comedians, we carried out a series of univariate analyses of variance using a Bonferroni correction. Six personality facets showed a significant mean difference between amateur and professional comedians: self-consciousness and anxiety (neuroticism), assertiveness (extraversion), intellectual curiosity (openness-to-experience), compliance or rather its lack (agreeableness), and deliberation or rather its lack (conscientiousness). In all cases where there was a significant difference, as expected, the professional comedians expressed personality conformed more closely to the requirements of effective stage performance than did that of amateurs (see Table 3).

We then repeated the previous MANOVA, but this time controlling for age as a covariate. Pillai's Trace dropped such that the discriminant variate explained only 18.7% of the total variance ($V = .2187$, $F = 3.94$, $df_1 = 10$, $df_2 = 171$, $p < .001$), and two of the differences (Compliance and Deliberation) became non-significant (see Table 3).

The results in Table 3 show that generally professional comedians conform well to the requirements of stage performance. With regard to neuroticism, even though professionals show higher levels of trait neuroticism than do amateurs, when on stage, professionals express appropriate levels of self-consciousness and anxiety, and score much lower than amateurs. Given that amateurs, in terms of mean level, are normal with respect to neuroticism but are much higher on the facets of self-consciousness and anxiety in terms of their stage presence, it is clear that professionals are much better able to adapt to the requirements of the stage and show much greater movement from their trait levels. With regard to the other two facets of neuroticism (angry hostility and impulsiveness), amateurs and professionals are similar and apparently both too high. The assertiveness facet of extraversion follows a similar pattern. Although professionals describe their trait levels of extraversion as lower than amateurs, on stage, the professionals show a higher and appropriate level of assertiveness, while amateurs fail to exhibit a sufficiently high level of this trait. With regard to openness, while both amateurs and professionals describe their trait levels similarly, on stage, professionals exhibit a much higher level of openness than amateurs, albeit short of what is apparently optimal for performance. In terms of the agreeableness facets of straightforwardness and compliance, while professionals and amateurs are similar with respect to straightforwardness, professionals exhibit a level of compliance much closer to requirements than do amateurs. Similarly, in terms of the two facets of conscientiousness, with regard to self-discipline, professionals and amateurs are both able to match task requirements, despite the professionals describing their trait levels of conscientiousness as relatively low, while professionals better meet requirements for lack of deliberation.

## Discussion

Both professional and amateur comedians showed unique trait-level personality profiles as compared with the normal population. Both were more open-to-experience, less conscientious, and more extraverted than their corresponding norm samples, while professionals additionally showed greater neuroticism. For comedians at least then, the prediction derived from the ASTMA (Roberts, 2006) and the TESSERA frameworks (Wrzus & Roberts, 2017), that comedians have a distinctive personality profile which conforms to the requirements of their profession, appears to hold (see below).

It should also be noted that, while our findings show a unique personality profile for the job of comedians, the contention of Schmidt and Hunter (1998) that a common personality profile predicts success across the majority of jobs may still hold (see Schmidt & Oh, 2010). However, the personality profile of comedians differs markedly from that found to confer an advantage in most work situations. Barrick, Mount, and Judge (2001), in their summary of meta-analytic findings, found that conscientiousness, neuroticism, and openness-to-experience correlated with work performance at .24, −.15, and .07, respectively. According to the ASTMA model, this would imply that the personality profile for most jobs would comprise an elevated level of conscientiousness, low neuroticism, and lowish levels of openness. So our findings show that comedians are much less conscientious, and much more neurotic and open-to-experience than would normally characterize most jobs.

Arguably a much more significant finding was that professional comedians' expression of personality on stage was more adaptive than was true for amateurs, and by a considerable margin. This occurred despite professionals' trait levels of neuroticism and extraversion diverging more from stage requirements than was so for amateurs. Moreover, this greater adaptability was evidenced across six personality facets spanning all of the FFM factors of personality. This suggests the existence of a general mechanism for regulation of personality expression to situational requirements. However, an individual-level analysis of our findings should shed more light on this.

However, when we controlled for age, the difference between amateur and professional comedians reduced overall and two of the differences became non-significant. We interpret this as indicating that regulation of personality expression increases with age, suggesting it can be learned through experience. Most likely this learning occurs both due to general and domain-specific practice (in our case, the greater experience of professional comedians with stage

performance); however, our analysis is not informative with respect to this distinction.

The findings also support our contention that variability in personality may be either functional or dysfunctional depending on whether the change in personality is in a direction consistent or inconsistent with situational requirements. This suggests a possible resolution of the apparent paradox that personality variability may be dysfunctional (Clifton & Kuper, 2011; Côté et al., 2012; Fournier et al., 2009; Russell et al., 2007; Zielger-Hill et al., 2013) or functional (Lievens et al., 2018; Minbashian et al., 2010). In short, measures of match will reflect functional variation while measures of mismatch will index dysfunctional variation in personality.

The strong suggestion in our findings that there is an individual difference in capacity to regulate personality expression in accordance with situational requirements may help explain another long-standing puzzle. Meta-analyses show that the effect of trait-level personality on job performance is useful but surprisingly small (Barrick et al., 2001), and this is also found, although to a lesser degree, at the facet level of analysis (Judge, Rodell, Klinger, Simon, & Crawford, 2013). In the somewhat limited case of comedians, it seems clear that this job requires variation in personality expression depending on whether the comedian is writing material or presenting. Given that most jobs vary in situational requirements, it may be that the ability to express personality in an adaptive manner may be more predictive of job performance than is trait-level personality.

Our expectation that professional comedians are high on neuroticism, openness, and extraversion, low on conscientiousness, and show no difference with regard to agreeableness compared with the general population, was supported. However, this prediction was based on the assumption that the creative writing role of comedians would predominate over the performance role, so the trait personality profile of professional comedians indicates that they are similar to those involved in roles which require a high degree of creation (e.g., Feist, 1998), rather than roles which are performance orientated (e.g., Nettle, 2006). Nevertheless, in most regards, professional comedians seem able to express the appropriate persona when they perform, irrespective of their personality levels. That is, they are adept at regulating their personality to conform with job requirements, at least while they are on stage. This fits with and extends the findings that individuals adapt their personality characteristics to fit situational requirements (Fleeson & Jayawickreme, 2015). Fittingly, the pattern of adaption is indicative of movement from the trait characteristics of an individual employed in a creative role toward that of one employed in a performance role. That is, in line with the situational requirements as rated by the experts, professional comedians showed increased levels of extraversion and agreeableness during their performance compared with their trait score, and much less neuroticism. This makes their situational (on-stage) personality expression more similar to performers than their trait scores (Nettle, 2006).

A partial exception from this pertains to neuroticism. While professional comedians seem able to regulate their self-consciousness and anxiety to an appropriate level on stage, according to our experts, they are nevertheless somewhat too high on angry hostility and impulsiveness as compared with amateurs, albeit these differences are slight. While our experts are of considerable distinction and command substantial experience, are they actually correct that angry hostility and impulsiveness are prejudicial to a stage performance? It seems more likely that the elevated scores of comedians on neuroticism are due to neurotic traits conferring an advantage. There are at least two possibilities consistent with this suggestion.

First, with regard to trait levels of neuroticism, it is well established that humor is a protective factor with respect to stress and depression (Southwick, Vythilingam, & Charney, 2005; Thorson & Powell, 1993). Thus, having a neurotic personality may be a strong motivator for comedians to deploy humor in everyday life. In addition, extensive practice is a pre-requisite for the development of expertise (Ericsson & Kintsch, 1995). Given that neuroticism likely motivates comedians to practice humor in everyday life, they probably develop a commensurate expertise with respect to humorousness, which would suit them for the profession. Of course, we did not ask our experts about trait levels of neuroticism, so there may actually be no discrepancy in this respect.

However, in more direct contradiction, it could be argued that neurotic traits directly contribute to the effectiveness of comedic performance. To take just one comedian (John Cleese), angry hostility and impulsivity seem quintessentially what make him funny and conforms to his general persona in Fawlty Towers. Although comedians differ, virtually all stand-up comics exhibit angry hostility, impulsiveness, and other neurotic traits as part of their performance. Indeed, it is the transgressive nature of comedy, which plays on our fears of embarrassment, which often makes it funny. John Cleese inadvertently referring to World War II, when serving a German customer, is amusing because he is aware of his social transgression, yet cannot avoid it. It arouses our fear that we may perpetrate something equally gauche. With any great comedian from Hancock to Milligan, surely it is the lack of control of neurotic traits which makes them funny.

We are arguing then that trait neuroticism is a more or less essential characteristic of successful comedians, and we can agree with our experts that the novelty or unexpectedness of successful comedy stems from openness (Kaufman et al., 2014; Silvia et al., 2011). So, these characteristics of professional comedians are required if comedians are to achieve in their profession.

While our sample of comedians is large compared with previous samples, especially when considering the intensity of the study, nevertheless, we cannot claim that the sample is representative, either of professional or amateur comedians.

The sample was ultimately a convenience sample and limited in size by time considerations. Necessarily, some of our findings are likely sample specific. Equally, this was an exploratory study with all its concomitant weaknesses. Also, although use of MG-CMSA and exact matching represents a substantial advance on previous studies of comedians, there was one covariate we were unable to control for, namely, educational level, which likely would have biased our estimates to a small degree. We must also acknowledge that there may be other unmeasured variables which may potentially have acted as confounds.

Overall, this study has shown that, as would be predicted by the ASTMA model (Roberts, 2006), comedians, as an occupational group, have a distinctive personality profile. Interestingly, this profile, consisting of low conscientiousness, moderate neuroticism, and high openness, differs substantially from the personality profile most typically associated with job success (Barrick et al., 2001). Furthermore, the results emanating from the assessment of on stage personality expression are consistent with the substantial body of work which shows that people regulate their personality expression to meet with situational and goal requirements (e.g., DeYoung, 2014; Fleeson & Jayawickreme, 2015). What the current findings add to the literature is that successful job incumbents, at least in the comedy field, show a much greater degree of adaptability than do amateurs, probably both due to greater experience and a stronger capacity for self-regulation.

## Authors' Note

This study was conducted for the award of a doctoral dissertation.

## Acknowledgment

We wish to thank Samuel Gosling for generously sharing his norm group data for the BFI.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iDs

Thomas V. Pollet https://orcid.org/0000-0002-4210-935X
D. J. Hughes https://orcid.org/0000-0002-3807-3809

## Supplemental Material

Supplemental material is available online with this article.

## Notes

1. There are a number of theoretical frameworks other than those considered here, which are relevant to the issue of why the personality profile of people employed in different occupations should be distinct. These would include theory concerning person-environment transactions (Roberts, Wood, & Caspi, 2008), which is closely related to the ASTMA framework, social investment theory (Lodi-Smith & Roberts, 2007), PERSOC which concerns itself with the interplay between PERsonality and SOCial relationships (Back et al., 2011), and trait activation theory (Tett & Burnett, 2003). However, a detailed consideration of all these frameworks would not be feasible here.
2. Jones, Brown, Serfass, and Sherman (2017) argue that the reliabilities of the standard deviation, skew, and kurtosis should be calculated from the residuals once the effects due to the mean and squared mean have been controlled for. Whether this is so or not must surely be dependent on whether mean level and personality variability are measured independently.
3. A test of whether completing the Big Five Inventory (BFI) on the night or at home biased responses found a non-significant Hotelling's $T$ ($V = .051$, $F = 1.20$, $df_1 = 5$, $df_2 = 112$, $p = .31$), with follow-up tests similarly non-significant. So, no biasing effect was supported by these data.

## References

Allik, J., Church, A. T., Ortiz, F. A., Rossier, J., Hřebičková, M., de Fruyt, F., . . .McCrae, R. R. (2017). Mean profiles of the NEO personality inventory. *Journal of Cross-Cultural Psychology*, *48*, 402-420.

Ando, V., Claridge, G., & Clark, K. (2014). Psychotic traits in comedians. *The British Journal of Psychiatry*, *204*, 341-345. doi:10.1192/bjp.bp.113.134569

Back, M. D., Baumert, A., Denissen, J. J. A., Hartung, F.-M., Penke, L., Schmukle, S. C., . . .Wrzus, C. (2011). PERSOC: A unified framework for understanding the dynamic interplay of personality and social relationships. *European Journal of Personality*, *25*, 90-107. doi:10.1002/per.811

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W.H. Freeman.

Barrick, M. R., Mount, M. K., & Judge, T. A. (2001). Personality and performance at the beginning of the new millennium: What do we know and where do we go next? *International Journal of Selection and Assessment*, *9*, 9-30. doi:10.1111/1468-2389.00160

Baumeister, R. F., Vohs, K. D., & Funder, D. C. (2007). Psychology as the science of self-reports and finger movements: Whatever happened to actual behavior? *Perspectives on Psychological Science*, *2*, 396-403. doi:10.1111/j.1745-6916.2007.00051.x

Bleidorn, W. (2009). Linking personality states, current social roles and major life goals. *European Journal of Personality*, *23*, 509-530. doi:10.1002/per.731

Block, J. (1995). A contrarian view of the five-factor approach to personality description. *Psychological Bulletin*, *117*, 187-215. doi:10.1037/0033-2909.117.2.187

Booth, T., & Hughes, D. (2014). Exploratory structural equation modeling of personality data. *Assessment*, *21*, 260-271. doi:10.1177/1073191114528029

Bradley-Geist, J. C., & Landis, R. S. (2012). Homogeneity of personality in occupations and organizations: A comparison of alternative statistical tests. *Journal of Business and Psychology*, *27*, 149-159. doi:10.1007/s10869-011-9233-6

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, *14*, 464-504. doi:10.1080/10705510701301834

Chortle. (2019). Comedians. Retrieved from http://www.chortle.co.uk/comics

Clifton, A., & Kuper, L. E. (2011). Self-reported personality variability across the social network is associated with interpersonal dysfunction. *Journal of Personality*, *79*, 359-389. doi:10.1111/j.1467-6494.2010.00686.x

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York, NY: Lawrence Erlbaum. doi:10.4324/9780203771587

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory and NEO Five-Factor Inventory professional manual*. Odessa, FL: Psychological Assessment Resources. doi:10.1037/t03907-000

Côté, S., Moskowitz, D. S., & Zuroff, D. C. (2012). Social relationships and intraindividual variability in interpersonal behavior: Correlates of interpersonal spin. *Journal of Personality and Social Psychology*, *102*, 646-659. doi:10.1037/a0025313

Del Giudice, M., Booth, T., & Irwing, P. (2012). The distance between Mars and Venus: Measuring global sex differences in personality. *PLoS ONE*, *7*(1), e29265. doi:10.1371/journal.pone.0029265

Denissen, J. J. A., Ulferts, H., Ludtke, O., Muck, P. M., & Gerstorf, D. (2014). Longitudinal transactions between personality and occupational roles: A large and heterogeneous study of job beginners, stayers, and changers. *Developmental Psychology*, *50*, 1931-1942. doi:10.1037/a0036994

DeYoung, C. G. (2014). Cybernetic Big Five theory. *Journal of Research in Personality*, *56*, 33-58.

Dolan, C. V., & Molenaar, P. C. M. (1994). Testing specific hypotheses concerning latent group differences in multi-group covariance structure analysis with structured means. *Multivariate Behavioral Research*, *29*, 203-222.

Ericsson, K. A., & Kintsch, W. (1995). Long-term working memory. *Psychological Review*, *102*, 211-245. doi:10.1037/0033-295x.102.2.211

Feist, G. J. (1998). A meta-analysis of the impact of personality on scientific and artistic creativity. *Personality and Social Psychology Review*, *2*, 290-309. doi:10.1207/s15327957pspr0204_5

Finch, J. F., & West, S. G. (1997). The investigation of personality structure: Statistical models. *Journal of Research in Personality*, *31*, 439-485. doi:10.1006/jrpe.1997.2194

Fisher, S., & Fisher, R. L. (1981). *Pretend the world is funny and forever: A psychological analysis of comedians, clowns, and actors*. Hillsdale, NJ: Lawrence Erlbaum. doi:10.4324/9781315802947

Fleeson, W. (2001). Toward a structure- and process-integrated view of personality: Traits as density distribution of states. *Journal of Personality and Social Psychology*, *80*, 1011-1027. doi:10.1037/0022-3514.80.6.1011

Fleeson, W., & Gallagher, P. (2009). The implications of big five standing for the distribution of trait manifestation in behavior: Fifteen experience-sampling studies and a meta-analysis. *Journal of Personality and Social Psychology*, *97*, 1097-1114. doi:10.1037/a0016786

Fleeson, W., & Jayawickreme, E. (2015). Whole trait theory. *Journal of Research in Personality*, *56*, 82-92. doi:10.1016/j.jrp.2014.10.009

Fleeson, W., & Law, M. K. (2015). Trait enactments as density distributions: The role of actors, situations, and observers in explaining stability and variability. *Journal of Personality and Social Psychology*, *109*, 1090-1104. doi:10.1037/a0039517

Fournier, M. A., Moskowitz, D. S., & Zuroff, D. C. (2009). The interpersonal signature. *Journal of Research in Personality*, *43*, 155-162. doi:10.1016/j.jrp.2009.01.023

French, B. F., & Finch, W. (2006). Confirmatory factor analytic procedures for the determination of measurement invariance. *Structural Equation Modeling*, *13*, 378-402. doi:10.1207/s15328007sem1303_3

Greengross, G., & Miller, G. F. (2009). The Big Five personality traits of professional comedians compared to amateur comedians, comedy writers, and college students. *Personality and Individual Differences*, *47*, 79-83.

Heller, D., Komar, J., & Lee, W. B. (2007). The dynamics of personality states, goals, and well-being. *Personality and Social Psychology Bulletin*, *33*, 898-910. doi:10.1177/0146167207301010

Ho, D. E., Imai, K., King, G., & Stuart, E. A. (2011). MatchIt: Nonparametric preprocessing for parametric causal inference. *Journal of Statistical Software*, 42(8), 1-28. doi:10.18637/jss.v042.i08

Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55. doi:10.1080/10705519909540118

Hughes, D. J., Lee, A., Tian, A. W., Newman, A., & Legood, A. (2018). Leadership, creativity, and innovation: A critical review and practical recommendations. *The Leadership Quarterly*, *29*, 549-569. doi:10.1016/j.leaqua.2018.03.001

Janus, S. S. (1975). The great comedians: Personality and other factors. *The American Journal of Psychoanalysis*, *35*, 169-174. doi:10.1007/bf01358189

Janus, S. S., Bess, B. E., & Janus, B. R. (1978). The great comediennes: Personality and other factors. *The American Journal of Psychoanalysis*, *38*, 367-372. doi:10.1007/bf01253595

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 114-158). New York, NY: Guilford Press.

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102-138). New York, NY: Guilford Press.

Jones, A. B., Brown, N. A., Serfass, D. G., & Sherman, R. A. (2017). Personality and density distributions of behavior, emotions, and situations. *Journal of Research in Personality*, *69*, 225-236. doi:10.1016/j.jrp.2016.10.006

Jordan, M., Herriot, P., & Chalmers, C. (1991). Testing Schneider's ASA theory. *Applied Psychology: An International Review*, *40*, 47-53. doi:10.1111/j.1464-0597.1991.tb01357.x

Judge, T. A., Rodell, J. B., Klinger, R. L., Simon, L. S., & Crawford, E. R. (2013). Hierarchical representations of the Five-Factor Model of personality in predicting job performance: Integrating three organizing frameworks with two theoretical perspectives. *Journal of Applied Psychology*, *98*, 875-925. doi:10.1037/a0033901

Kaufman, S. B., Quilty, L. C., Grazioplene, R. G., Hirsch, J. B., Gray, J. R., Peterson, J. B., & DeYoung, C. G. (2014). Openness to experience and intellect differentially predict creative achieve-

ment in the arts and sciences. *Journal of Personality*, *84*, 249-258. doi:10.1111/jopy.12156

King, D. D., Ott-Holland, C. J., Ryan, A. M., Huang, J. L., Wadlington, P. L., & Elizondo, F. (2017). Personality homogeneity in organizations and occupations: Considering similarity sources. *Journal of Business and Psychology*, *32*, 641-653. doi:10.1007/s10869-016-9459-4

Lievens, F., Lang, W. B., De Fruyt, F., Corstjens, J., de Vijver, M., & Bledlow, R. (2018). The predictive power of people's intra-individual variability across situations: Implementing whole trait theory in assessment. *Journal of Applied Psychology*, *103*, 753-771. doi:10.1037/apl0000280

Little, T. D. (2013). *Longitudinal structural equation modeling*. New York, NY: Guildford press.

Lodi-Smith, J., & Roberts, B. W. (2007). Social investment and personality: A meta-analysis of the relationship of personality traits to investment in work, family, religion, and volunteerism. *Personality and Social Psychology Review*, *11*, 68-86. doi:10.1177/1088868306294590

McCabe, K. O., & Fleeson, W. (2012). What is extraversion for? Integrating trait and motivational perspectives and identifying the purpose of extraversion. *Psychological Science*, *23*, 1498-1505. doi:10.1177/0956797612444904

McCrae, R. R., & Costa, P. T., Jr. (2008). Empirical and theoretical status of the five-factor model of personality traits. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment: Personality theories and models* (Vol. 1, pp. 273-294). Thousand Oaks, CA: SAGE.

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, *58*, 525-543.

Miller, J. D., & Lynam, D. R. (2015). Understanding psychopathy using the basic elements of personality. *Social and Personality Psychology Compass*, *9*, 223-237. doi:10.1111/spc3.12170

Millsap, R. E., & Kim, H. (2018). Factorial invariance across multiple populations in discrete and continuous data. In P. Irwing, T. Booth, & D. J. Hughes (Eds.), *Wiley handbook of psychometric testing: A multidisciplinary reference on survey, scale and test development* (pp. 849-884). London, England: John Wiley.

Minbashian, A., Wood, R. E., & Beckmann, N. (2010). Task-contingent conscientiousness as a unit of personality at work. *Journal of Applied Psychology*, *95*, 793-806. doi:10.1037/a0020016

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, *102*, 246-268. doi:10.1037/0033-295x.102.2.246

Nettle, D. (2006). Psychological profiles of professional actors. *Personality and Individual Differences*, *40*, 375-383. doi:10.1016/j.paid.2005.07.008

Paunonen, S. V., & Jackson, D. N. (2000). What is beyond the Big Five? Plenty! *Journal of Personality*, *68*, 821-835. doi:10.1111/1467-6494.00117

Perunovic, W. Q. E., Heller, D., Ross, M., & Komar, S. (2011). The within-person dynamics of intrinsic and extrinsic motivation, affective states, and cultural identification: A diary study of bicultural individuals. *Social Psychological and Personality Science*, *2*, 635-641. doi:10.1177/1948550611405071

Ployhart, R. E., Weekley, J. A., & Baughman, K. (2006). The structure and function of human capital emergence: A multi-level examination of the attraction-selection-attrition model. *Academy of Management Journal*, *49*, 661-677. doi:10.5465/amj.2006.22083023

R Development Core Team. (2008). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing.

Roberts, B. W. (2006). Personality development and organizational behavior. *Research in Organizational Behavior*, *27*, 1-40. doi:10.1016/s0191-3085(06)27001-1

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*, 1-25.

Roberts, B. W., Wood, D., & Caspi, A. (2008). Personality development. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 375-398). New York, NY: Guilford Press.

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*, 41-55.

Russell, J. J., Moskowitz, D. S., Zuroff, D. C., Sookman, D., & Paris, J. (2007). Stability and variability of affective experience and interpersonal behavior in borderline personality disorder. *Journal of Abnormal Psychology*, *116*, 578-588. doi:10.1037/0021-843x.116.3.578

Satterwhite, R. C., Fleenor, J. W., Braddy, P. W., Feldman, J., & Hoopes, L. (2009). A case for homogeneity of personality at the occupational level. *International Journal of Selection and Assessment*, *17*, 154-164. doi:10.1111/j.1468-2389.2009.00459.x

Schaubroeck, J., Ganster, D., & Jones, J. (1998). Organization and occupation influences in the attraction-selection-attrition process. *Journal of Applied Psychology*, *83*, 869-891. doi:10.1037/0021-9010.83.6.869

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, *8*(2), 23-74.

Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin*, *124*, 262-274. doi:10.1037/0033-2909.124.2.262

Schmidt, F. L., & Oh, I. S. (2010). Can synthetic validity methods achieve discriminant validity? *Industrial and Organizational Psychology*, *3*, 344-350. doi:10.1017/S1754942600002510

Schmidt, F. L., Shaffer, J. A., & Oh, I. S. (2008). Increased accuracy for range restriction corrections: Implications for the role of personality and general mental ability in job and training performance. *Personnel Psychology*, *61*, 827-868. doi:10.1111/j.1744-6570.2008.00132.x

Sherman, R. A., Rauthmann, J. F., Brown, N. A., Serfass, D. G., & Jones, A. B. (2015). The independent effects of personality and situations on real-time expressions of behavior and emotion. *Journal of Personality and Social Psychology*, *109*, 872-888. doi:10.1037/pspp0000036

Silvia, P. J., Kaufman, J. C., Reiter-Palmon, R., & Wigert, B. (2011). Cantankerous creativity: Honesty-humility, agreeableness, and the HEXACO structure of creative achieve-

ment. *Personality and Individual Differences*, *51*, 687-689. doi:10.1016/j.paid.2011.06.011

Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: Implications for prevention and treatment. *Annual Review of Clinical Psychology*, *1*, 255-291. doi:10.1146/annurev.clinpsy.1.102803.143948

Sutin, A. R., & Costa, P. (2010). Reciprocal influences of personality and job characteristics across middle adulthood. *Journal of Personality*, *78*, 257-288. doi:10.1111/j.1467-6494.2009.00615.x

Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, *88*, 500-517. doi:10.1037/0021-9010.88.3.500

Thorson, J. A., & Powell, F. C. (1993). Sense of humor and dimensions of personality. *Journal of Clinical Psychology*, *49*, 799-809.

Widaman, K. F., & Reise, S. P. (1997). Exploring the measurement invariance of psychological instruments: Applications in the substance use domain. In K. J. Bryant, M. Windle, & S. G. West (Eds.), *The science of prevention: Methodological advances from alcohol and substance abuse research* (pp. 281-324). Washington, DC: American Psychological Association.

Woods, S. A., Wille, B., Wu, C. H., Lievens, F., & de Fruyt, F. (2019). The influence of work on personality trait development: The demands-affordances TrAnsactional (DATA) model, an integrative review, and research agenda. *Journal of Vocational Behavior*, *110*, 258-271. doi:10.1016/j.jvb.2018.11.010

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, *26*, 179-201. doi:10.5465/amr.2001.4378011

Wrzus, C., & Roberts, B. W. (2017). Processes of personality development in adulthood: The TESSERA framework. *Personality and Social Psychology Review*, *21*, 253-277. doi:10.1177/1088868316652279

Zeigler-Hill, V., Li, H., Masri, J., Smith, A., Vonk, J., Madson, M. B., & Zhang, Q. (2013). Self-esteem instability and academic outcomes in American and Chinese college students. *Journal of Research in Personality*, *47*, 455-463. doi:10.1016/j.jrp.2013.03.010