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Stability and plasticity in personality: A meta-analytic investigation of their influence on cultural intelligence and five forms of job performance

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Abstract

This meta-analysis clarifies and tests the structural relationships among the Big Five personality traits, cultural intelligence (CQ), and an expanded criterion domain of job performance. Positioning CQ in the nomological network of personality traits is timely because research has demonstrated that CQ predicts a range of work-related outcomes in today's multicultural workplace. Drawing on the Cybernetic Big Five Theory (CB5T), we conduct a meta-analytic investigation ($n = 24{,}552$; $k = 109$) of the metatraits of stability (shared variance of conscientiousness, agreeableness, and emotional stability) and plasticity (shared variance of extraversion and openness) on CQ and five job performance outcomes (task performance, affiliative citizenship performance, change-oriented citizenship performance, adaptive performance, and creative performance). Our findings show that CQ is a stronger mediator of the plasticity metatrait (than stability) on job performance, supporting our hypotheses. We also discover intriguing suppressor effects, suggesting that the importance of the plasticity metatrait on job performance could be underestimated in existing Big Five meta-analyses.

KEYWORDS
cultural intelligence, job performance, metatraits, personality

INTRODUCTION

Globalization has profoundly shaped the nature of work. Lau and Shaffer (2023) argue that even domestic organizations "that do not have operations in other countries are not immune to the vagaries of globalization as they often have to contend with increased competition streaming from global competitors or manage a culturally diverse workforce" (p. 57). Set in this context, research that examines individual differences in meeting the pluralistic demands of today's diverse and complex workplace offers important selection implications for organizations.

One promising predictor of performance in multicultural settings is cultural intelligence (CQ), defined as an individual's capability to function effectively in multicultural contexts (Ang et al., 2007; Earley & Ang, 2003). Ang et al. (2007) conceptualized CQ as a four-factor construct comprising motivational, cognitive, metacognitive, and behavioral factors. Existing meta-analyses support the bi-factor nature of CQ and show that both the four-factor model and a single-factor latent model of CQ predict a myriad of work outcomes in intercultural contexts (Rockstuhl & Van Dyne, 2018; Schlaegel et al., 2021).

What is less understood is how CQ relates to the Big Five personality—an established individual difference predictor of job performance in I/O psychology. Apart from the trait of openness to experience that has been shown to relate to all four factors of CQ (e.g., see Ang et al., 2006; Presbitero, 2016), existing studies yield mixed relationships for the other four personality traits with CQ. For instance, conscientiousness correlated positively with meta-cognitive CQ in Ang et al.'s (2006) and Li et al.'s (2016) research but not in Şahin et al.'s (2014) study. Agreeableness correlated positively with behavioral CQ in Ang et al.'s (2006) and Şahin et al.'s (2014) studies but not in Li et al.'s (2016) study. However, Li et al.'s (2016) study reported a positive correlation between emotional stability and meta-cognitive CQ but not for Ang et al. (2006) and Şahin et al. (2014).

The inconsistent findings between personality traits and CQ present a fragmented state of research. The differences could arise from methodological differences across studies such as differences in sample characteristics and measurement errors (Schmidt & Hunter, 2014). It could also point to the need for more complex theorizing that considers the interdependencies between personality traits and their latent dynamics with CQ. For instance, a few studies have examined the interactive effects of different personality traits on CQ (e.g., Li et al., 2016; Şahin et al., 2014), thus acknowledging that personality traits do not affect CQ independently of each other. Another promising and parsimonious approach to model the interdependencies of personality traits and their effects on CQ is to adopt a hierarchical perspective of personality, which recognizes that the five personality traits are not orthogonal (DeYoung et al., 2002; Digman, 1997).

Our meta-analysis builds and tests a parsimonious, theory-driven model of personality, CQ, and job performance to offer novel insights (see Figure 1 for our general model). Specifically, we extend existing research in two major ways. First, unlike existing studies on CQ that have focused on the Big Five traits individually, we draw on the Cybernetics Big Five Theory (CB5T) (DeYoung, 2015) to examine the metatraits of stability (operationalized as the shared variance of conscientiousness, agreeableness, and emotional stability) and plasticity (shared variance of

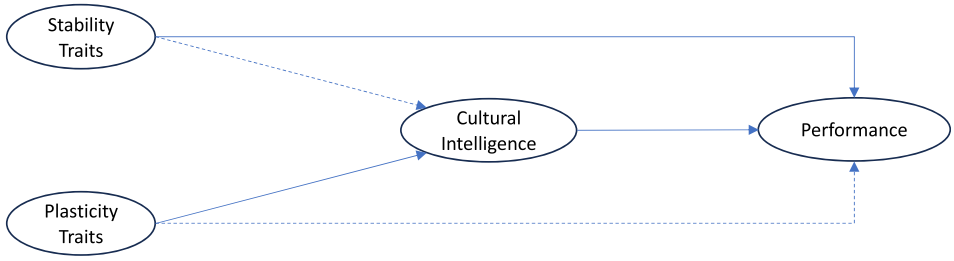

FIGURE 1 Hypothesized structural model.

openness and extraversion). A considerable amount of research shows that the Big Five traits are not orthogonal but instead are represented by two higher-order factors in the personality hierarchy known as the stability metatrait and the plasticity metatrait (DeYoung, 2006; DeYoung et al., 2002; Digman, 1997). The stability metatrait emphasizes maintaining ongoing goal-directed functioning with minimal disruption, whereas the plasticity metatrait emphasizes the exploration and integration of new information.

Second, the increasing cultural diversity in organizations necessitates a more multifaceted view of job performance. In this meta-analysis, we examine five forms of performance outcomes: task performance, affiliative citizenship performance, change-oriented citizenship performance, adaptive performance, and creative performance. We focus on these five performance outcomes because they differ in their relevance to stability and plasticity traits and because they are the most widely studied performance outcomes in the CQ literature to date. Adaptive performance and creative performance might be especially relevant for multicultural settings, given the need for employees to respond to changing expectations and situations, as well as to leverage the diversity of views to generate novel ideas.

By drawing on CB5T, we seek to offer a new theoretical perspective on how and why the Big Five and CQ affect job performance. For CQ research, our findings deepen our understanding of the nature of CQ as it relates to human coping mechanisms by examining CQ's relationship with threat-based responses (represented by the stability metatrait) versus reward-based responses (represented by the plasticity metatrait). For personality research, our findings add novel insights to the existing wealth of meta-analytic findings that consistently show that traits under the stability metatrait are generally more important predictors of job performance than those under the plasticity metatrait (see second-order meta-analysis by He et al., 2019). We demonstrate that plasticity traits (openness and extraversion) have "hidden" effects on job performance when we consider them in relation to CQ.

THEORY DEVELOPMENT

The CB5T and metatraits

CB5T defines personality traits as the relatively stable patterns of emotion, motivation, cognition, and behavior that individuals exhibit in response to external stimuli. Underlying the CB5T is the premise that humans are goal-directed, self-regulating systems, and personality is an "evolved cybernetic system" that enables humans to "adjust their behaviors to their situation from moment to moment to accomplish their goals, and hence, to survive and reproduce"

(DeYoung, 2015, p. 34). Fundamental to any cybernetic system is entropy, broadly defined as the level of uncertainty within the system. For humans, psychological entropy occurs when what one encounters is not what one expects. Given that the unknown can lead to both good and bad outcomes (Peterson, 1999), the mechanisms that humans develop to respond to uncertainties fall broadly into two categories: threat versus reward.

DeYoung (2015) argued that the threat and reward mechanisms can be mapped to the stability and plasticity metatraits, respectively. The stability metatrait (reflecting the shared variance of conscientiousness, agreeableness, and emotional stability) emphasizes a threat-based response and control mechanisms that protect the cybernetic system from being disrupted by impulses. However, the plasticity metatrait (reflecting the shared variance of openness and extraversion) takes a reward-based response to uncertainty and emphasizes exploration, expansive learning, and the creation of new goals and strategies.

Research on CB5T further suggests a neurobiological perspective for the links between the metatraits and threat/reward responses. Specifically, DeYoung (2010) posits that the serotonergic and dopaminergic systems are the major biological substrates of stability and plasticity, respectively. This is consistent with studies that show that serotonin stabilizes information processing in the brain and helps to maintain ongoing cybernetic function by resisting impulsive disruption to goal achievement (Carver et al., 2008; Gray & McNaughton, 2000). However, dopamine facilitates exploration, approach, learning, and cognitive flexibility to seek rewards and discover information in unpredictable situations (Bromberg-Martin et al., 2010; DeYoung, 2013). Existing neurophysiological and neuropsychological evidence supports these arguments, showing that the serotonergic and dopaminergic systems play complementary roles in avoiding negative outcomes (threat response) versus seeking positive outcomes (reward response) (Duerler et al., 2022; Rogers, 2011).

Cultural intelligence as characteristic adaptations

The CB5T argues for a causal relationship between stable personality traits and characteristic adaptations. Characteristic adaptations are the "skills, habits, attitudes, and relationships that result from the interaction of individual and environment; they are the concrete manifestations of basic tendencies" such as the Big Five (McCrae & Costa, 1996, p. 69). DeYoung (2015) distinguished personality traits and characteristics adaptations by the degree of universality across cultures and individuals. While personality traits are universally found across cultures and individuals, characteristic adaptations are more specific to individuals, shaped by their life experiences and circumstances.

We posit that cultural intelligence (CQ) is a form of characteristic adaptation that is partly influenced by personality traits. CQ refers to an individual's capability to function effectively in contexts characterized by cultural diversity (Ang & Van Dyne, 2008; Earley & Ang, 2003). Ang and colleagues (Ang et al., 2007) defined CQ as a malleable capability that can be developed through experience, education, and training (Ang et al., 2020; Raver & Van Dyne, 2017). Drawing on Sternberg's (1986) multi-loci theory, Ang et al. (2007) conceptualized CQ as an aggregate four-factor construct that comprises motivational, cognitive, metacognitive, and behavioral capabilities that facilitate individuals' effectiveness in culturally diverse settings. The four factors are (1) motivational CQ—one's energy and effort directed toward functioning effectively in culturally diverse situations; (2) cognitive CQ—one's knowledge about cultural similarities and differences; (3) metacognitive CQ—one's level of conscious cultural awareness in culturally

diverse settings; and (4) behavioral CQ—one's repertoire of speech acts, verbal, and nonverbal behaviors to enact culturally appropriate actions.

Recent research by Rockstuhl and Van Dyne (2018, 2023) reconciled debates over the factor structure of CQ by arguing for its bi-factor nature, that is, the coexistence of a holistic (i.e., general) factor as well as the four factors. Theoretically, conceptualizing CQ as a bi-factor model acknowledges the presence of complex dynamics amongst the four CQ factors that are distinct from the unique effects of individual CQ factors. For instance, Rockstuhl and Van Dyne (2018) argued that the motivation to learn about other cultures (motivational CQ) may increase one's knowledge of culture (cognitive CQ), which in turn enhances one's self-efficacy in crossing cultures (motivational CQ) and active thinking, interpreting, and checking of assumptions (metacognitive CQ). Empirically, meta-analytic evidence shows that the holistic CQ factor consistently predicts all outcomes, whereas specific CQ factors demonstrate differential validity. Moreover, the holistic CQ factor tends to explain more variance in the outcomes than the specific CQ factors (Rockstuhl & Van Dyne, 2018; Schlaegel et al., 2021).

For theoretical parsimony, we examine CQ as a single holistic construct. Besides offering conceptual and analytical elegance, the single-factor CQ is "conceptually broader than any factor individually and thus represents the complexity of the capability to function effectively" in culturally diverse settings (Rockstuhl & Van Dyne, 2018, p. 126). Given that performance outcomes are complex and multifaceted constructs, studying CQ as a single factor is consistent with the principle of predictor and criterion fidelity-bandwidth compatibility.

Drawing on arguments from CB5T, we argue that CQ is more related to the metatrait of plasticity than stability. Cross-cultural interactions are inherently filled with uncertainties because of deeply entrenched differences in the way people think, feel, and act (Gudykunst, 1998). Moreover, social identity theory (Tajfel & Turner, 1979) suggests that people tend to categorize people into ingroup and outgroup based on salient characteristics such as nationality and ethnicity. Such social categorization often leads to prejudicial conceptions of outgroup members, further accentuating the uncertainty and unpredictability of working with people from different cultures.

Individuals who approach and learn from cross-cultural interactions amidst these uncertainties are more likely to be driven by reward-seeking and learning, which is associated with plasticity. DeYoung (2015) described people high in plasticity as "not only prone to respond to anomaly more flexibly and eagerly when it appears unexpectedly, they also tend to seek out the unknown voluntarily" (p. 49). Specifically, those who are high in extraversion are more motivated by the possibility of attaining rewards, such as the reward of learning new things or overcoming challenges during cross-cultural interactions, while those who are high in openness tend to engage with new information and form new interpretations of people who are different from them. We argue that the heightened motivation and attention aroused by the novelty and uncertainty of cultural diversity predisposes these individuals to acquire CQ by being curious and attentive to wide-ranging cues and by expending effort to learn and remember information and actions that lead to effective outcomes.

By contrast, the stability metatrait is related to the cybernetic system of maintaining goal-directed functioning. This suggests that high-stability individuals are more likely to cope with the stress and anxieties arising from cultural novelties and uncertainties than those with low stability. For instance, conscientious individuals are more likely to direct their attention away from distracting thoughts to focus on achieving their goals during cross-cultural interactions (Fox et al., 2006). Individuals high in agreeableness are more likely to engage in social information processing, such as perspective-taking and empathy, as well as refrain from aggressive

behaviors toward others (DeYoung et al., 2010, 2013). People with high emotional stability tend to control their emotional responses in the face of uncertainty and threat to goal attainment. However, those with low emotional stability (or high neuroticism) constantly scan for threats by paying increased attention to sensory inputs and information in memory (Hirsh et al., 2012).

We argue that the focus of the stability metatrait on achieving long-term goals and social harmony can facilitate the acquisition of CQ, although the relationship is not as apparent and strong as that with the plasticity metatrait. Unlike high-plasticity individuals, high-stability individuals focus more on avoiding disruptions in achieving their goals, rather than exploring and learning from the unknown environment. High-stability individuals could, in the course of achieving their goals, acquire CQ. Nonetheless, because their primary motive is to maintain predictability and goal-functioning, they are likely to be less spontaneous and exploratory than high-plasticity individuals. As such, we propose that:

> **Hypothesis 1.** The plasticity metatrait has a stronger relationship with CQ than the stability metatrait.

Job performance

Job performance is a complex, multifaceted construct. In this study, we examine five types of performance: (1) task performance, (2) affiliative citizenship performance, (3) change-oriented citizenship performance, (4) adaptive performance, and (5) creative performance.

Task performance refers to behaviors that directly transform raw materials into goods and services or serve and maintain the technical core through indirect services (Motowildo et al., 1997). Carpini et al. (2017) classified task performance as a proficient form of performance where behaviors are formalized. Effective task performance involves fairly predictable behaviors emphasizing goal-directed achievement (versus impulsive disruption), social harmony, and coping with negative emotions. These behaviors are more congruent with the stability metatrait than the plasticity metatrait.

Citizenship performance refers to discretionary behaviors that are not formally prescribed but are important for the "maintenance and enhancement of the social and psychological context that supports task performance" (Organ, 1997, p. 91). Citizenship performance further consists of affiliative behaviors directed toward individuals or the organization; and change-oriented behaviors aimed at improving the status quo (Chiaburu et al., 2011). Affiliative citizenship performance, with its emphasis on helping others achieve organizational goals, is more congruent with the stability metatrait's tendencies for solidarity and getting along (Hogan & Holland, 2003), impulse restraint (Digman, 1997), and respect for social conventions (Paulhus & John, 1998). Nevertheless, change-oriented citizenship performance requires individuals to speak up with new ideas to improve existing processes, which may disrupt social harmony. Such behaviors are more likely to be congruent with the plasticity metatrait's tendencies for curiosity and dominance (Chiaburu et al., 2011).

Adaptive performance refers to the extent to which one alters their behavior to meet new or changing demands in the workplace (Pulakos et al., 2000). Tasks that involve adaptation include the handling of crises, stress, and uncertain work situations; learning new technologies; and showing cultural, interpersonal, and physical adaptability. Finally, creative performance refers to the extent to which one generates novel and useful outcomes in one's work domain (Zhou & George, 2001). Adaptive and creative performance are both especially important in

dynamic and competitive environments where demands constantly evolve, suggesting that they are more likely to be congruent with the plasticity metatrait's tendencies for exploration and experimentation (Amabile, 1988; Huang et al., 2014).

Two theoretical perspectives explain why CQ is important for job performance in multicultural settings. First, role theory posits that performance is the extent to which individuals meet role expectations—that is, what behaviors are considered appropriate and effective (Katz & Kahn, 1978). Because role expectations are shaped in part by cultural values, role expectations in a multicultural environment inevitably become more diverse and complex. Second, intergroup theory postulates that "intergroup encounters are anxiety-arousing and that people are prompt to avoid outgroup members (Yzerbyt & Demoulin, 2012, p. 253). Similarly, Gudykunst's (1998) anxiety–uncertainty management theory suggests that interacting with people from another cultural group is inherently stressful because of unpredictabilities in communication. Indeed, research on homophily offers evidence of our tendency to avoid people who are different from us (e.g., McPherson et al., 2001).

We argue that individuals with CQ are likely to perform better in the multicultural workplace because they possess the requisite motivation, knowledge, and skills to overcome the challenges suggested by role theory and intergroup research. For instance, individuals with higher CQ are likely to have a more accurate understanding of role expectations for formally prescribed work as well as less formally prescribed behaviors such as organizational citizenship behavior (OCB), adaptive performance, and creative performance. This is because they tend to exert more effort to learn and discern what is culturally appropriate; have a richer cultural schema to observe, interpret, and explain potential differences; and possess a greater behavioral repertoire to enact the appropriate actions (Ang et al., 2007).

Similarly, individuals with higher CQ are less likely to avoid cross-cultural interactions at work and build a more culturally diverse social network. Multicultural social networks enable individuals to gain resources that can aid in their own task performance or in helping others (Scott et al., 2018), as well as gain new ideas and insights that enhance their adaptive performance and creativity (Chua, 2018). Recent meta-analytic research supports these arguments. For instance, in both meta-analyses by Rockstuhl and Van Dyne (2018) and Schlaegel et al. (2021), the single-factor CQ predicted task performance. In addition, Rockstuhl and Van Dyne's meta-analysis showed that the single-factor CQ predicted citizenship performance and adaptive performance. Hence, we propose that

> **Hypothesis 2.** CQ is positively related to task performance (H2a), affiliative citizenship performance (H2b), change-oriented citizenship performance (H2c), adaptive performance (H2d), and creative performance (H2e).

McCrae and Costa (1996) posit in their metatheoretical framework of personality that effects of basic tendencies on behaviors are mediated by characteristic adaptations. That is, differences in personality traits lead to variability in skills, habits, attitudes, and relationships, which, in turn, affect behavioral outcomes. Based on this argument, we propose that CQ mediates the effects of the metatraits on job performance. Moreover, in line with our earlier hypothesis that the plasticity metatrait is more strongly related to CQ than the stability metatrait, we expect CQ to be a stronger mediator of the plasticity metatrait on job performance than the stability metatrait. That is, the distal effects of plasticity on the multiple job performance outcomes are more likely to be explained via CQ than the effects of stability.

Hypothesis 3. CQ is a stronger mediator of plasticity effects than stability effects on task performance (H3a), affiliative citizenship performance (H3b), change-oriented citizenship performance (H3c), adaptive performance (H3d), and creative performance (H3e).

METHODS

Ethics and open science statement

This study includes only secondary data and did not require IRB approval at our institution. We describe our sampling plan, inclusion/exclusions decisions, and the operationalization of all variables included in the study. Data were analyzed using both Excel and the lavaan (Rosseel, 2012), metafor (Viechtbauer, 2010), and rwa (Chan, 2020) packages in R. The data and analysis code are available on the Open Science Framework (OSF; https://osf.io/xjdqu/?view_only=75b5bee1eb5246928c89252e9fe81e05). The study design, hypotheses, and analysis plan for this study were not preregistered.

Literature search

We used multiple strategies to locate published and unpublished research (see Figure 2 for the Preferred Reporting Items for Systematic reviews and Meta-Analyses [PRISMA] flow statement). First, we conducted a keyword search in June 2023 in the Web of Science, SCOPUS, PsycINFO, and Proquest Dissertation databases using *Cultural Intelligence* as a keyword. Second, we supplemented this search with a backward citation search of articles identified in earlier CQ meta-analyses by Rockstuhl and Van Dyne (2018) and Schlaegel et al. (2021), which included empirical CQ research up to 2017. Third, we conducted a forward citation search on CQ scales (Ang et al., 2007; Thomas et al., 2015; Van Dyne et al., 2012) using the Web of Science and SCOPUS databases. Fourth, we searched the references of all articles identified in the first three searches to locate additional CQ papers. Finally, we contacted key authors of CQ research for unpublished research. This search effort produced an initial pool of 2302 articles from 2003 through June 2023.

Inclusion and exclusion criteria

Meta-analyses require several judgments (Morris, 2023). Following recommendations from Aguinis et al. (2011), we included primary studies if they met the following criteria. First, we scanned the titles and abstracts of all articles for relevance to the topic. At this stage, we excluded conceptual papers and papers that did not include empirical data on CQ. We also excluded studies that focused on variables at the team (e.g., Iskhakova & Ott, 2020) or firm level (e.g., Ang & Inkpen, 2008) of CQ because our focus is on relationships at the individual level of analysis. Consistent with previous CQ meta-analyses (Rockstuhl & Van Dyne, 2018; Schlaegel et al., 2021), we included studies on working adults and students.

This initial scan resulted in 339 full-text papers, which we then screened based on two additional inclusion criteria. First, we included only primary studies that report correlation

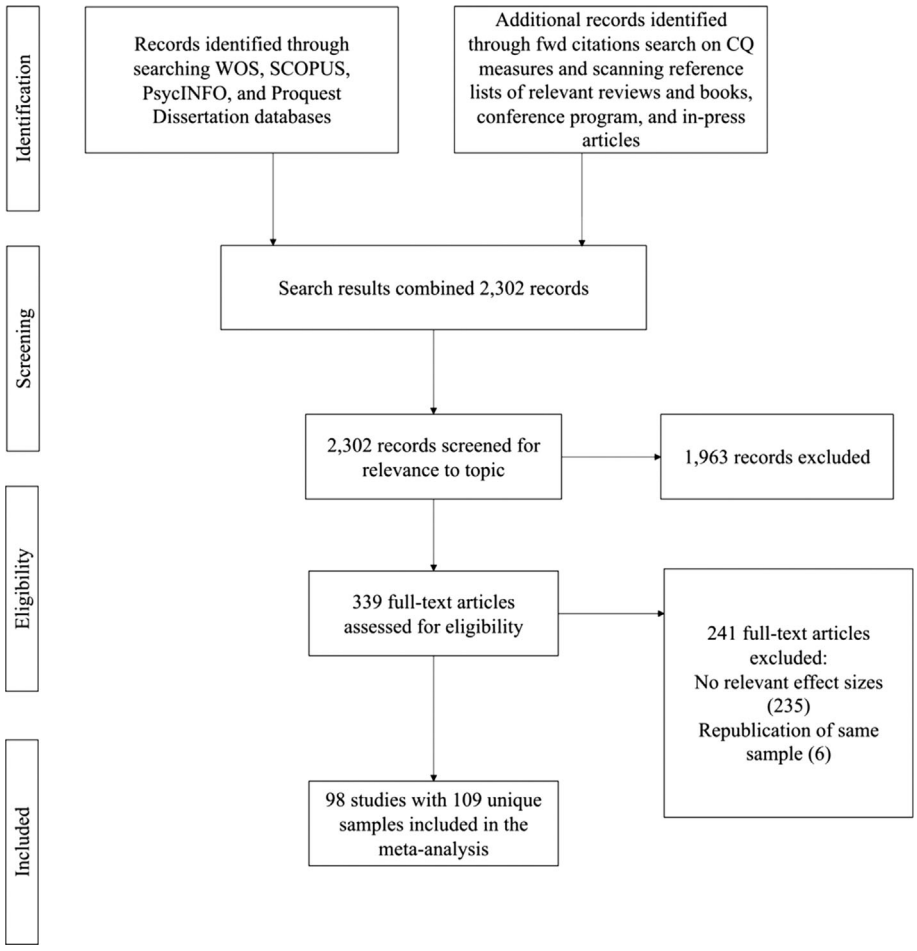

FIGURE 2 PRISMA flow used to identify studies reporting correlations of CQ with Big Five personality traits or performance outcomes. PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses.

coefficients or provide sufficient information to compute a correlation coefficient of CQ with Big Five personality traits or performance outcomes. Second, we included data from unique samples, using data from the final journal publication in cases where different studies were based on the same sample (e.g., dissertations or conference papers that were subsequently published).

The final database included 98 studies with 109 distinct samples. Together, these studies reported 922 correlations among CQ, Big Five personality traits, and performance outcomes. The combined sample size comprises 24,552 respondents from more than 50 countries (see Appendix S1 at OSF for the fully coded data).

Coding and sample characteristics

One author and two research assistants independently coded or computed correlations for CQ, Big Five personality traits, and performance outcomes. We also coded for study characteristics

including the type of performance outcome; whether the research design included same-source or different-source ratings of independent and dependent variables; whether the sample comprised working adults or students; the diversity of the job context in the sample (diverse job context, i.e., expatriates or global job roles vs. local job roles); and whether the manuscript was published or unpublished. The sample size of each empirical study was recorded as the number of observations used to compute the correlation coefficient. Agreement between the coders was high (Cohen's $\kappa = .88$). We resolved disagreements (mostly typographical errors, choice of sample size when studies reported a range of sample sizes, and errors in reverse-coding negatively worded items) following the discussion-and-consensus approach advocated by Podsakoff et al. (2006). We report the main codes and input values for the primary studies in our meta-analyses in the supporting information.

We coded five types of performance outcomes. For task performance, we included measures of in-role behavior and task performance (e.g., Kraimer & Wayne, 2004; Williams & Anderson, 1991). For affiliative citizenship performance, we included measures of extra-role and citizenship behaviors (e.g., Kraimer & Wayne, 2004; Williams & Anderson, 1991). For change-oriented citizenship performance, we included measures of proactive behavior (e.g., Ashford & Black, 1996) and voice (e.g., Van Dyne & LePine, 1998). For adaptive performance, we included measures of adaptive performance (e.g., Griffin & Hesketh, 2003; Pulakos et al., 2000). For creative performance, we included measures of creative performance (e.g., Zhou & George, 2001) and innovative work behaviors (e.g., De Jong & Den Hartog, 2010).

Analyses

Outliers and publication bias check

We checked for univariate outliers following Viechtbauer and Cheung's procedures (2010). For these analyses, we screened correlations using multiple outlier and influential case statistics, that is, externally standardized residuals, difference in fits (DFFITS) values, Cook's distances, covariance ratios, leave-one-out estimates of heterogeneity, hat values, and weights. We did not identify outliers or influential cases for our primary meta-analyses involving CQ and Big-Five personality traits. However, we did identify one extreme outlier for performance outcomes. Closer inspection of this outlier revealed that it involved an implausible correlation (i.e., after correcting for measurement error, the correlation between CQ and performance exceeded 1.0). We, therefore, excluded this outlier from our analyses.

We also checked for potential publication bias using cumulative forest plots for evidence of "drift" in the cumulative point estimate (Viechtbauer, 2010). Results did not show evidence of publication bias in the relationships of CQ with Big Five personality traits or performance outcomes.

Meta-analytic procedures

We synthesized correlation coefficients across primary studies following Schmidt and Hunter's (2014) random-effects meta-analysis approach. We corrected each primary correlation for attenuation because of unreliability in CQ measures and correlates. If studies did not report reliabilities, we used the average reliability across available studies.

We then estimated population correlations ρ and computed 95% confidence intervals and 80% credibility intervals around ρ. A 95% CI that excludes zero indicates that the relationship is meaningfully different from zero. An 80% CV that excludes zero suggests that relationships are generalizable across situations. We also report the *Q* statistic (Hedges & Olkin, 1985) to formally test for the potential presence of moderators to relationships.

Hypotheses tests

We followed the theory-testing method developed by Viswesvaran and Ones (1995) to test our hypotheses. We created a meta-analytically derived correlation matrix as input for structural equation modeling analyses (e.g., Harrison et al., 2006). We constructed this meta-analytic correlation matrix by combining our original CQ meta-analyses and previously published meta-analyses.

We then tested our hypotheses using structural equation models estimated using the lavaan package in R (Rosseel, 2012). We initially compared models that specified CQ as a full versus partial mediator of personality effects in these analyses. We then decomposed the total effects of stability and plasticity traits into their direct and indirect effects and computed the difference between the stability and plasticity effects to test our hypotheses about their relative strength. We constructed 95% CIs using bootstrap estimates of standard errors based on 1000 bootstrap samples for all estimated effects.

Finally, we explored the relative importance of Big Five and CQ factors as predictors of performance outcomes following the relative weights analysis procedures in Nimon and Oswald (2013). We computed relative weights using the rwa package in R (Chan, 2020). The r-syntax for all analyses is available as an online supporting information at the OSF repository.

RESULTS

We report all original CQ meta-analyses in Tables 1 and 2. Table 1 shows the relationships of the Big Five personality traits with the four CQ factors. Table 2 reports the relationships of the four CQ factors with the five job performance outcomes. Finally, Table 3 reports the meta-analytic correlation matrix that we used as input for our hypothesis tests. This matrix includes the five performance outcomes, the four CQ factors, and the Big Five personality traits and was constructed by combining our original CQ meta-analyses with findings from previously published meta-analyses.

Hypothesis testing

We tested our proposed structural relationships of plasticity traits, stability traits, CQ, and job performance using meta-analytic structural equation modeling. A partial mediation model fit the data significantly better than a full mediation model both when treating the five performance outcomes as indicators of an overall performance construct ($\Delta\chi^2$ [$2df$] = 72.83, $p < .01$) and when considering each performance outcome separately (task performance: $\Delta\chi^2$ [$2df$] = 64.90, $p < .01$; affiliative citizenship performance: $\Delta\chi^2$ [$2df$] = 248.38, $p < .01$; change-oriented citizenship performance: $\Delta\chi^2$ [$2df$] = 125.74, $p < .01$; adaptive performance: $\Delta\chi^2$ [$2df$]

TABLE 1 Meta-analytic population correlations between Big Five personality traits and CQ factors.

Big Five personality trait	k	N	r	ρ	SDρSDρ	Lower	Upper	Lower	Upper	Q	p(Q)p(Q)
Openness to experience											
Metacognitive CQ	38	9638	.28	.33	.11	.19	.47	.28	.38	115.94	.000
Cognitive CQ	40	10,388	.23	.29	.10	.15	.42	.24	.33	117.71	.000
Motivational CQ	39	10,901	.30	.39	.13	.23	.55	.34	.44	164.73	.000
Behavioral CQ	39	10,299	.20	.24	.14	.07	.42	.18	.30	169.58	.000
Extraversion											
Metacognitive CQ	33	8450	.19	.21	.10	.09	.33	.16	.26	86.41	.000
Cognitive CQ	34	8842	.14	.19	.10	.06	.31	.14	.24	92.43	.000
Motivational CQ	35	9482	.27	.32	.07	.23	.42	.28	.36	74.51	.000
Behavioral CQ	33	8753	.14	.17	.11	.03	.31	.11	.22	104.19	.000
Conscientiousness											
Metacognitive CQ	28	7191	.14	.20	.07	.11	.29	.14	.25	51.40	.003
Cognitive CQ	29	7583	.04	.05	.07	−.04	.14	.01	.09	54.94	.002
Motivational CQ	28	7494	.12	.14	.09	.02	.27	.09	.20	71.97	.000
Behavioral CQ	28	7494	.13	.16	.07	.08	.25	.12	.21	50.51	.004
Agreeableness											
Metacognitive CQ	26	7043	.16	.23	.11	.08	.37	.15	.30	83.07	.000
Cognitive CQ	27	7435	.07	.09	.10	−.04	.22	.03	.15	73.74	.000
Motivational CQ	26	7346	.20	.24	.12	.09	.39	.17	.31	93.85	.000
Behavioral CQ	26	7346	.14	.19	.09	.07	.31	.14	.24	67.65	.000
Emotional stability											
Metacognitive CQ	26	7071	.09	.12	.05	.05	.19	.08	.16	38.70	.039
Cognitive CQ	27	7463	.04	.06	.06	−.02	.14	.01	.10	46.63	.008
Motivational CQ	27	7930	.15	.18	.08	.08	.29	.13	.24	64.24	.000
Behavioral CQ	26	7374	.05	.04	.07	−.05	.12	−.01	.08	47.52	.004

Note: *k*=number of correlations; *N*=combined sample size; *r*=mean uncorrected correlation; *ρ* = estimated true score correlation corrected for measurement error; CV=credibility interval; CI=confidence interval. *Q*=*Q*-statistic for homogeneity in the true score correlations across studies.

TABLE 2 Meta-analytic population correlations between CQ factors and performance outcomes.

Performance outcome	k	N	r	ρ	SDρSDρ	Lower	Upper	Lower	Upper	Q	p(Q)p(Q)
Task performance											
Metacognitive CQ	43	7753	.29	.39	.18	.15	.62	.32	.46	257.06	.000
Cognitive CQ	44	8410	.24	.28	.18	.04	.52	.22	.34	274.19	.000
Motivational CQ	45	8671	.27	.32	.18	.08	.55	.25	.38	279.40	.000
Behavioral CQ	40	7524	.29	.36	.16	.16	.56	.31	.42	194.13	.000
Affiliative citizenship performance											
Metacognitive CQ	16	3054	.26	.33	.08	.23	.43	.26	.40	30.50	.010
Cognitive CQ	15	2711	.18	.22	.18	−.01	.44	.11	.32	73.39	.000
Motivational CQ	13	2492	.32	.40	.16	.19	.61	.29	.52	66.84	.000
Behavioral CQ	13	2572	.29	.39	.18	.16	.62	.28	.50	79.70	.000
Change-oriented citizenship performance											
Metacognitive CQ	3	589	.26	.25	.10	.13	.38	.01	.49	7.33	.026
Cognitive CQ	3	589	.24	.18	.16	−.03	.40	−.13	.50	14.86	.001
Motivational CQ	3	589	.29	.23	.19	−.01	.48	−.10	.57	20.27	.000
Behavioral CQ	3	589	.21	.19	.09	.08	.31	−.03	.41	6.49	.039
Adaptive performance											
Metacognitive CQ	8	1307	.25	.32	.11	.18	.45	.20	.43	18.09	.012
Cognitive CQ	8	1307	.21	.27	.12	.11	.42	.14	.39	20.37	.005
Motivational CQ	8	1307	.25	.31	.11	.18	.45	.19	.43	18.64	.009
Behavioral CQ	8	1307	.26	.31	.13	.14	.48	.19	.44	23.24	.002
Creative Performance											
Metacognitive CQ	12	2240	.37	.45	.21	.19	.71	.32	.58	106.16	.000
Cognitive CQ	10	2082	.25	.34	.21	.07	.61	.18	.49	88.81	.000
Motivational CQ	6	1350	.37	.46	.20	.20	.72	.28	.64	62.39	.000
Behavioral CQ	6	1350	.24	.35	.28	−.01	.71	.09	.60	100.23	.000

Note: k=number of correlations; N=combined sample size; r=mean uncorrected correlation; ρ = estimated true score correlation corrected for measurement error; CV=credibility interval; CI=confidence interval. Q=Q-statistic for homogeneity in the true score correlations across studies.

TABLE 3 Meta-analytic correlation matrix used for regression, relative weights, and structural equation modeling analyses.

Variable		1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Task performance	–												
2.	Affiliative citizenship performance	.74[f]	–											
3.	Change-oriented citizenship performance	.37[i]	.49[i]	–										
4.	Adaptive performance	.63[g]	.43[g]	.63[j]	–									
5.	Creative performance	.55[h]	.56[h]	.57[j]	.53[g]	–								
6.	Metacognitive CQ	.39	.33	.25	.32	.45	–							
7.	Cognitive CQ	.28	.22	.18	.27	.34	.56[a]	–						
8.	Motivational CQ	.32	.40	.23	.31	.46	.63[a]	.54[a]	–					
9.	Behavioral CQ	.36	.39	.19	.31	.35	.61[a]	.51[a]	.57[a]	–				
10.	Openness to experience	.12[c]	.03[c]	.21[e]	.03[d]	.27[e]	.33	.29	.39	.24[b]	–			
11.	Extraversion	.12[c]	.22[c]	.26[e]	.08[d]	.19[e]	.21	.19	.32	.17[b]	.38[b]	–		
12.	Conscientiousness	.25[c]	.32[c]	.17[e]	.09[d]	.14[e]	.20	.05	.14	.16[b]	.20[b]	.24[b]	–	
13.	Agreeableness	.10[c]	.18[c]	.10[e]	.07[d]	.12[e]	.23	.09	.24	.19[b]	.28[b]	.28[b]	.40[b]	–
14.	Emotional Stability	.08[c]	.16[c]	.11[e]	.16[d]	.09[e]	.12	.06	.18	.04[b]	.09[b]	.34[b]	.29[b]	.22[b]

Note: N (Harmonic mean) = 3666. All the correlations are true-score correlations. All correlations were calculated with the Hunter–Schmidt method.

[a]Rockstuhl & Van Dyne (2018).

[b]Park et al. (2020).

[c]Judge et al. (2013).

[d]Huang et al. (2014): Openness to experience = average of inquisitive and learning approach; Extraversion = average of ambition and sociability; Conscientiousness = prudence; Agreeableness = interpersonal sensitivity; Emotional stability = adjustment).

[e]Zare & Flinchbaugh (2019).

[f]Hoffman et al. (2007).

[g]Griffin et al. (2007).

[h]Harari et al. (2016).

[i]Chamberlain et al. (2017).

[j]metaBUS database (Bosco et al., 2017).

= 75.26, $p < .01$; and creative performance: $\Delta\chi^2$ [$2df$] = 10.90, $p < .01$). Thus, we interpret path coefficients from the partial mediation model (as shown in Figures 3–8). Table 4 shows the latent variable correlations among personality traits, CQ, and overall performance, whereas Table 5 compares the effects of stability and plasticity traits as predictors of overall performance and the five specific performance outcomes from the respective partial mediation models decomposed into total effect, direct effect, and indirect effect.

Hypothesis 1 predicted that plasticity traits would be more strongly associated with CQ than stability traits. Results in Figure 3 show that the direct effect of stability traits on CQ was not significant ($\beta = -.06$, *ns*). By contrast, the direct effect of plasticity traits on CQ was positive and significant ($\beta = .63$, $p < .01$). We also computed the difference between the effects of stability and plasticity together with its associated 95% CI based on 1000 bootstrap samples as a direct test of Hypothesis 1. Results show that the difference between the direct effects of stability traits minus plasticity traits was negative and significant ($\Delta\beta = -.69$, $p < .01$). This significant difference shows that the effect of plasticity traits on CQ is significantly stronger than the effect of stability traits. Thus, Hypothesis 1 is supported.

Hypothesis 2 predicted that CQ would be positively associated with task performance (H2a), affiliative citizenship performance (H2b), change-oriented citizenship performance (H2c), adaptive performance (H2d), and creative performance (H2e). Results are consistent with Hypothesis 2. CQ had a positive and significant effect on overall performance ($\beta = .63$, $p < .01$) and all five specific performance outcomes: task performance ($\beta = .53$, $p < .01$), affiliative citizenship performance ($\beta = .56$, $p < .01$), change-oriented citizenship performance ($\beta = .09$, $p < .01$), adaptive performance ($\beta = .55$, $p < .01$), and creative performance ($\beta = .48$, $p < .01$). Thus, Hypothesis 2 is supported.

Finally, Hypothesis 3 predicted that CQ would be a stronger mediator for plasticity traits than stability traits across all performance outcomes. Table 5 shows that the indirect effects of stability traits were not significant for overall performance ($\beta = -.04$, *ns*) and all five performance outcomes: task performance ($\beta = -.03$, *ns*), affiliative citizenship performance ($\beta = -.02$, *ns*), change-oriented citizenship performance ($\beta = -.00$, *ns*), adaptive performance ($\beta = -.03$, *ns*), and creative performance ($\beta = -.03$, *ns*). By contrast, the indirect effects of plasticity traits were positive and significant for overall performance ($\beta = .39$, $p < .01$) and all five performance outcomes: task performance ($\beta = .33$, $p < .01$), affiliative citizenship performance ($\beta = .34$, $p < .01$), change-oriented citizenship performance ($\beta = .06$, $p < .01$), adaptive performance ($\beta = .34$, $p < .01$), and creative performance ($\beta = .30$, $p < .01$).

As a direct test of Hypothesis 3, we computed the difference between the indirect effects by subtracting the plasticity indirect effect from the stability indirect effect and calculating the 95% CI of this difference using 1000 bootstrap samples. Results show that the difference between the indirect effects of stability traits versus plasticity traits was negative and significant for overall performance ($\Delta\beta = -.43$, $p < .01$) and all five performance outcomes: task performance ($\Delta\beta = -.36$, $p < .01$), affiliative citizenship performance ($\Delta\beta = -.36$, $p < .01$), change-oriented citizenship performance ($\Delta\beta = -.06$, $p < .01$), adaptive performance ($\Delta\beta = -.37$, $p < .01$), and creative performance ($\Delta\beta = -.33$, $p < .01$). These differences show that the indirect effects of plasticity traits via CQ are stronger than the indirect effects of stability traits. Thus, Hypothesis 3 is supported.

Results in Table 5 also reveal interesting suppressor effects for plasticity traits as predictors of traditional performance outcomes. Specifically, the introduction of CQ as a mediator reveals contrasting negative direct and positive indirect effects of plasticity traits on performance that would have been masked by considering personality traits alone. Comparing the total effects,

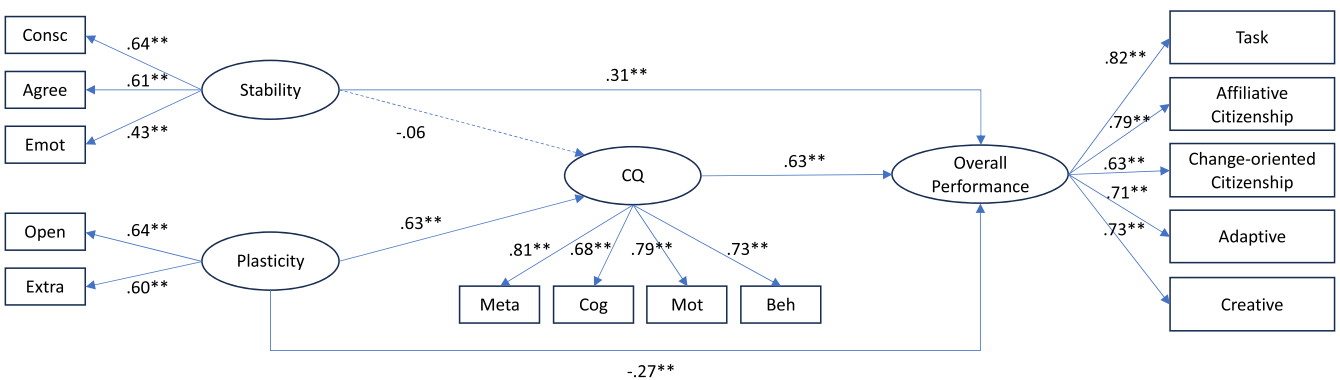

FIGURE 3 Meta-analytic structural equation modeling results for overall performance. Effect sizes are standardized path coefficients. *$p < .05$; **$p < .01$.

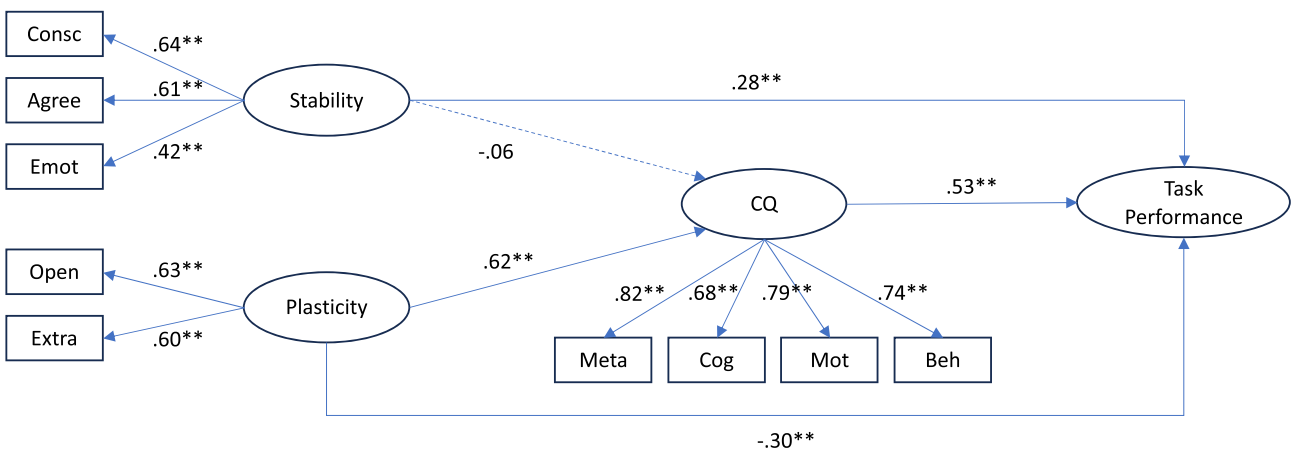

FIGURE 4 Meta-analytic structural equation modeling results for task performance. Effect sizes are standardized path coefficients. *$p < .05$; **$p < .01$.

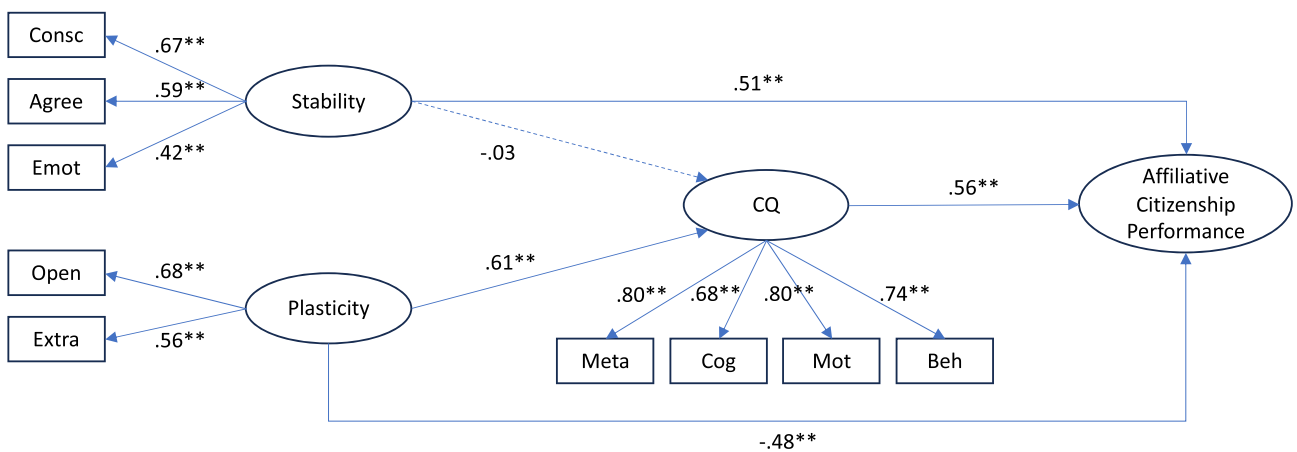

FIGURE 5 Meta-analytic structural equation modeling results for affiliative citizenship performance. Effect sizes are standardized path coefficients. *$p < .05$; **$p < .01$.

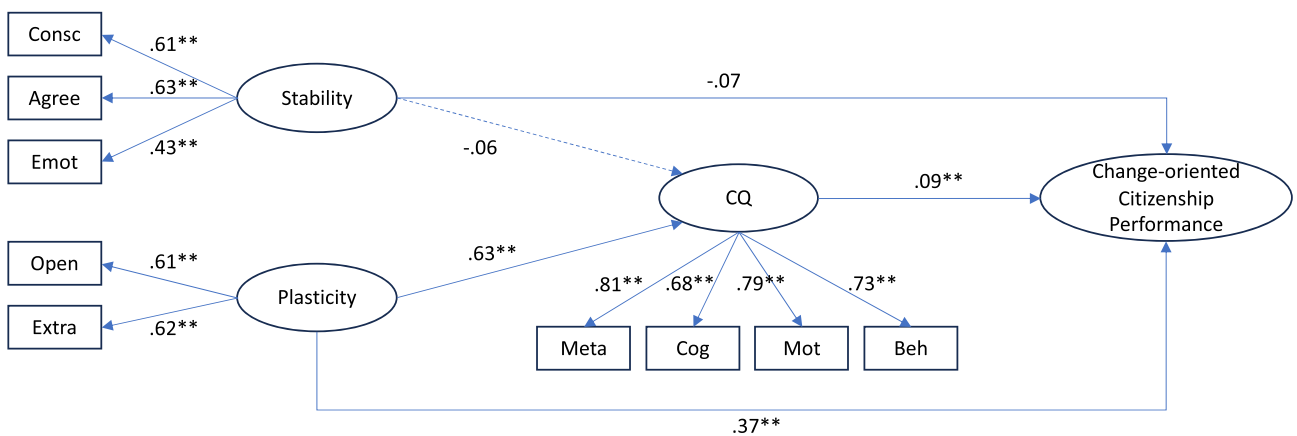

FIGURE 6 Meta-analytic structural equation modeling results for change-oriented citizenship performance. Effect sizes are standardized path coefficients. *$p < .05$; **$p < .01$.

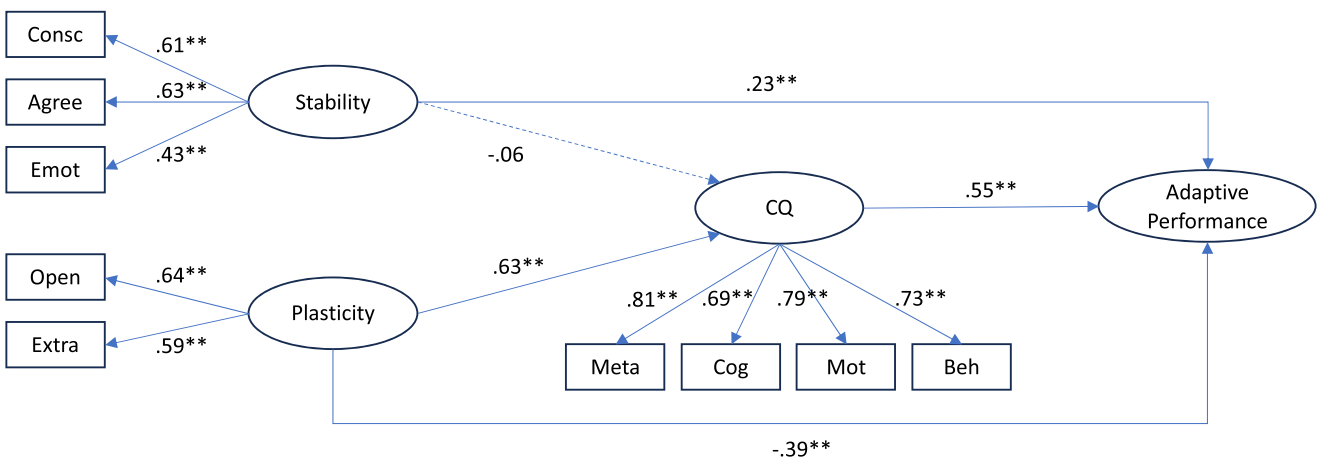

FIGURE 7 Meta-analytic structural equation modeling results for adaptive performance. Effect sizes are standardized path coefficients. *$p < .05$; **$p < .01$.

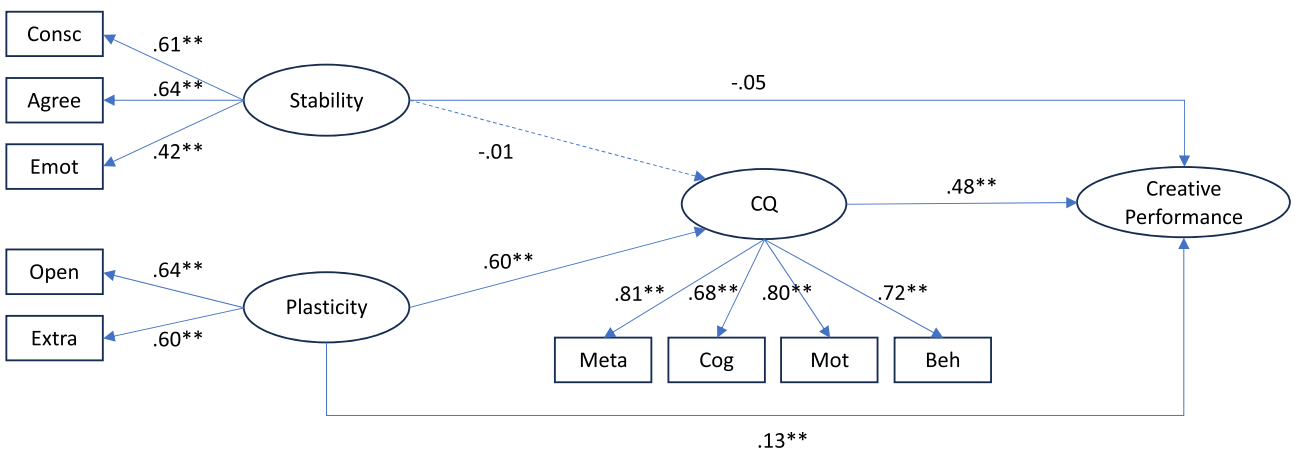

FIGURE 8 Meta-analytic structural equation modeling results for creative performance. Effect sizes are standardized path coefficients. *$p < .05$; **$p < .01$.

TABLE 4 Latent variable correlations among plasticity traits, stability traits, CQ, and overall performance.

Variable		1	2	3	4
1.	Performance	–			
2.	CQ	.58	–		
3.	Plasticity traits	.30	.59	–	
4.	Stability traits	.36	.36	.66	–

Note: N (harmonic mean) = 3666.

direct effects, and indirect effects of plasticity traits highlights such suppressor effects for overall performance (total effect: $\beta = .12$, $p < .01$; direct effect: $\beta = -.27$, $p < .01$; indirect effect: $\beta = .39$, $p < .01$), task performance (total effect: $\beta = .03$, *ns*; direct effect: $\beta = -.30$, $p < .01$; indirect effect: $\beta = .33$, $p < .01$), affiliative citizenship performance (total effect: $\beta = -.14$, $p < .01$; direct effect: $\beta = -.48$, $p < .01$; indirect effect: $\beta = .34$, $p < .01$), and adaptive performance (total effect: $\beta = -.05$, *ns*; direct effect: $\beta = -.39$, $p < .01$; indirect effect: $\beta = .34$, $p < .01$). Change-oriented citizenship performance (total effect: $\beta = .43$, $p < .01$; direct effect: $\beta = .37$, $p < .01$; indirect effect: $\beta = .06$, $p < .01$) and creative performance (total effect: $\beta = .43$, $p < .01$; direct effect: $\beta = .13$, $p < .01$; indirect effect: $\beta = .30$, $p < .01$) were the sole exceptions to this pattern, showing positive direct and indirect effects.

Sensitivity analyses of CQ–performance relationships for different subpopulations

We conducted additional analyses to rule out potential confounds arising from different subpopulations underlying our meta-analytic matrix (Oh, 2020). For instance, the studies in our meta-analysis use a mix of self-reported and non-self-reported outcomes from student and employee samples, whereas most existing meta-analyses of personality and performance restrict studies to non-self-ratings of employee samples.[1] To assess whether this is a concern, we re-ran our analyses for different subsets of CQ studies, that is, CQ studies using only employee samples, CQ studies using only non-self-ratings of performance, and CQ studies that used non-self-ratings of performance for employees only. We also re-ran our analyses for the subset of studies examining CQ–performance relationships in culturally diverse job contexts (expatriates or global/culturally diverse job roles) only.

We summarize the results from our sensitivity analyses in Table 6 (see Tables S1–S5 #1 for the detailed moderator analyses for CQ–performance relationships). Table 6 shows that results using different subsets of CQ studies are comparable to the full dataset and support our hypotheses, with one exception for change-oriented citizenship performance: Hypotheses 2 and 3 are not supported for change-oriented citizenship performance when using (1) employee samples only, (2) samples with only non-self-ratings of performance, and (3) employee samples with only non-self-ratings of performance, plausibly because of the small number of studies involved ($k = 1$–2).

[1]For an exception, Zare and Flinchbaugh's (2019) meta-analysis reported non-self-ratings of creative performance that combined employee and student samples.

TABLE 5 Meta-analytic effect decomposition for stability and plasticity personality traits as predictors of performance outcomes.

	Overall performance			Task performance			Affiliative citizenship performance		
	est.	95% CI	ß	est.	95% CI	ß	est.	95% CI	ß
Stability traits									
Total effect	.35	[.24; .46]	.27	.40	[.28; .51]	.26	.74	[.64; .86]	.49
Direct effect	.40	[.30; .50]	.31	.44	[.33; .57]	.28	.76	[.65; .90]	.51
Indirect effect (via CQ)	−.05	[−.13; .02]	−.04	−.05	[−.12; .02]	−.03	−.02	[−.11; .04]	−.02
Plasticity traits									
Total effect	.16	[.05; .27]	.12	.04	[−.08; .16]	.03	−.21	[−.32; −.11]	−.14
Direct effect	−.35	[−.48; −.22]	−.27	−.47	[−.64; −.33]	−.30	−.71	[−.87; −.57]	−.48
Indirect effect (via CQ)	.51	[.42; .63]	.39	.51	[.41; .65]	.33	.50	[.39; .64]	.34
Difference									
Total effect	.19	[−.02; .40]	.15	.36	[.13; .58]	.23	.95	[.75; 1.16]	.63
Direct effect	.75	[.51; .97]	.58	.91	[.68; 1.19]	.58	1.47	[1.23; 1.76]	.99
Indirect effect (via CQ)	−.56	[−.75; −.41]	−.43	−.56	[−.76; −.39]	−.36	−.53	[−.73; −.36]	−.36

Note: est. = unstandardized effect. 95% CI = 95% confidence interval for unstandardized effect. ß = standardized effect estimate.

TABLE 5 (Continued)

	Change-oriented citizenship performance			Adaptive performance			Creative performance		
	est.	95% CI	ß	est.	95% CI	ß	est.	95% CI	ß
Stability traits									
Total effect	−.12	[−.27; .01]	−.07	.32	[.20; .45]	.20	−.13	[−.29; −.01]	−.08
Direct effect	−.11	[−.26; .01]	−.07	.37	[.23; .53]	.23	−.09	[−.20; .02]	−.05
Indirect effect (via CQ)	−.01	[−.03; .01]	.00	−.05	[−.15; .03]	−.03	−.04	[−.12; .02]	−.03

(Continues)

TABLE 5 (Continued)

	Change-oriented citizenship performance			Adaptive performance			Creative performance		
	est.	**95% CI**	***ß***	**est.**	**95% CI**	***ß***	**est.**	**95% CI**	***ß***
Plasticity traits									
Total effect	.70	[.56; .89]	.43	−.07	[−.19; .05]	−.05	.68	[.54; .84]	.43
Direct effect	.61	[.44; .81]	.37	−.60	[−.78; −.44]	−.39	.20	[.06; .34]	.13
Indirect effect (via CQ)	.09	[.04; .15]	.06	.53	[.42; .68]	.34	.48	[.40; .58]	.30
Difference									
Total effect	−.82	[−1.14; −.57]	−.50	.39	[.15; .63]	.24	−.81	[−1.12; −.56]	−.51
Direct effect	−.72	[−1.06; −.44]	-.44	.98	[.70; 1.29]	.62	−.29	[−.52; −.06]	−.18
Indirect effect (via CQ)	−.10	[−.17; −.04]	−.06	−.58	[−.82; −.40]	−.37	−.52	[−.69; −.39]	−.33

Note: est. = unstandardized effect. 95% CI = 95% confidence interval for unstandardized effect. *ß* = standardized effect estimate.

TABLE 6 Summary of sensitivity analyses comparing results from full sample with various subsets of samples for CQ – performance relationships.

	Sample		H1: Personality on CQ	H1: Personality on CQ	H1: Personality on CQ	H2:	H3: Indirect effects via CQ			Support for		
	k	N	Plasticity	Stability	P - S	CQ ≥ DV	Plasticity	Stability	P - S	H1	H2	H3
DV: overall performance												
Full sample	7	1404	.63**	−.06	.69**	.63**	.39**	−.04	.43**	Y	Y	Y
Employees	3	688	.63**	−.06	.69**	.67**	.43**	−.04	.47**	Y	Y	Y
Different source	4	787	.62**	−.06	.68**	.41**	.26**	−.02	.28**	Y	Y	Y
Employees/different source	2	447	.62**	−.06	.68**	.47**	.29**	−.03	.32**	Y	Y	Y
Diversity job context	6	1131	.62**	−.06	.68**	.62**	.39**	−.03	.42**	Y	Y	Y
DV: Task performance												
Full sample	43	8063	.62**	−.06	.68**	.53**	.33**	−.03	.36**	Y	Y	Y
Employees	36	6913	.62**	−.06	.68**	.57**	.36**	−.03	.39**	Y	Y	Y
Different source	19	3632	.62**	−.05	.67**	.38**	.24**	−.02	.26**	Y	Y	Y
Employees/different source	13	2495	.62**	−.05	.67**	.47**	.29**	−.02	.31**	Y	Y	Y
Diversity job context	35	6957	.62**	−.06	.68**	.54**	.34**	−.03	.37**	Y	Y	Y
DV: affiliative citizenship performance												
Full sample	14	2691	.61**	−.03	.64**	.56**	.34**	−.02	.36**	Y	Y	Y
Employees	11	2188	.61**	−.02	.63**	.62**	.37**	−.02	.39**	Y	Y	Y
Different source	6	881	.62**	−.05	.66**	.34**	.21**	−.02	.23**	Y	Y	Y
Employees/different source	3	435	.62**	−.05	.66**	.37**	.23**	−.02	.25**	Y	Y	Y
Diversity job context	13	2430	.61**	−.03	.65**	.53**	.33**	−.02	.34**	Y	Y	Y
DV: change-oriented citizenship performance												
Full sample	3	589	.62**	−.06	.69**	.09**	.06**	−.01	.06**	Y	Y	Y

(Continues)

TABLE 6 (Continued)

	Sample		H1: Personality on CQ	H1: Personality on CQ	H1: Personality on CQ	H2:	H3: Indirect effects via CQ			Support for		
	k	N	Plasticity	Stability	P - S	CQ ≥ DV	Plasticity	Stability	P - S	H1	H2	H3
Employees	1	205	.63**	−.07	.70**	.05	.03	.00	.04	Y	N	N
Different source	2	508	.62**	−.06	.69**	−.02	−.02	.00	−.02	Y	N	N
Employees/different source	1	205	.63**	−.07	.70**	.05	.03	.00	.04	Y	N	N
Diversity job context	3	589	.62**	−.06	.69**	.09**	.06**	−.01	.06**	Y	Y	Y
DV: adaptive performance												
Full sample	8	1307	.63**	−.06	.68**	.55**	.34**	−.03	.37**	Y	Y	Y
Employees	6	889	.63**	−.05	.68**	.55**	.34**	−.03	.37**	Y	Y	Y
Different source	6	732	.62**	−.05	.68**	.59**	.37**	−.03	.40**	Y	Y	Y
Employees/different source	5	625	.62**	−.05	.68**	.56**	.35**	−.03	.38**	Y	Y	Y
Diversity job context	6	897	.62**	−.05	.68**	.65**	.40**	−.03	.44**	Y	Y	Y
DV: creative performance												
Full sample	8	1661	.63**	−.06	.69**	.48**	.30**	−.03	.33**	Y	Y	Y
Employees	6	1500	.63**	−.06	.69**	.53**	.34**	−.03	.37**	Y	Y	Y
Different source	3	623	.63**	−.05	.68**	.11**	.07**	−.01	.08**	Y	Y	Y
Employees/different source	2	495	.63**	−.06	.69**	.17**	.11**	−.01	.12**	Y	Y	Y
Diversity job context	5	950	.62**	−.05	.68**	.36**	.23**	−.02	.24**	Y	Y	Y

Note: Different source = studies with only non-self-ratings of performance outcomes. Sample sizes *N* and *k* reflect the harmonic means across four CQ factors. All effect sizes are standardized effect sizes. Y = Hypothesis is supported. N = Hypothesis is not supported.

*$p < .05$, and **$p < .01$.

TABLE 7 Meta-analytic regression results and relative importance of Big Five personality traits as predictors of overall CQ.

	Overall CQ	
Variables	**Model 1**	**RWs**
Openness to experience	.28**	57.80%
Extraversion	.10**	18.90%
Conscientiousness	.04**	6.10%
Agreeableness	.09**	14.10%
Emotional stability	.03*	3.10%
Adjusted R2	.18	

Note: N (Harmonic mean) = 3666. Effects sizes are standardized regression coefficients. RWs = Relative weights (in % of R^2). $^{*}p < .05$, and $^{**}p < .01$.

Exploratory analyses of the relative importance of Big Five traits and CQ factors

As an exploratory analysis, we conducted meta-analytic regression and relative importance analyses of the Big Five traits as predictors of overall CQ. Table 7 reports these results and highlights three interesting findings. First, consistent with Hypothesis 1, the plasticity traits of openness to experience (RW = 57.8%) and extraversion (RW = 18.9%) are more important predictors of overall CQ than the stability traits of agreeableness (RW = 14.1%), conscientiousness (RW = 6.1%), and emotional stability (RW = 3.1%). Second, among the plasticity traits, openness to experience is 3.1 times more important as a predictor of CQ than extraversion. Third, agreeableness is the most important predictor of CQ among the stability traits.

We similarly conducted meta-analytic regression and relative importance analyses of the Big Five traits and the four CQ factors as predictors of the performance outcomes. Table 8 shows the results of these analyses. For task performance, CQ explained 14% of variance over and above the 7% explained by personality. CQ was also overall a more important predictor than personality (RWs = 76.1% vs 23.9%), with stability traits (RW = 21.4%) more important than plasticity traits (RW = 2.5%). Among the CQ factors, metacognitive CQ (RW = 27.7%) and behavioral CQ (RW = 22.9%) are particularly important, while conscientiousness (RW = 19.5%) is the most important stability trait.

For affiliative citizenship performance, CQ explained 17% of variance over and above the 13% explained by personality. At the same time, CQ was a slightly more important predictor of affiliative citizenship performance than personality (RWs = 60.8% vs 39.2%). Stability traits (RW = 27.0%) are more important than plasticity traits (RW = 12.2%), with conscientiousness (RW = 21.8%) again being the most important stability trait. Among the CQ factors, motivational CQ (RW = 24.1%) is particularly important, followed by behavioral CQ (RW = 21.9%) and, to a lesser extent, metacognitive CQ (RW = 10.4%).

For change-oriented citizenship performance, CQ explained 3% of variance over and above the 9% explained by personality. Interestingly, personality (RW = 57.4%) was overall more important than CQ (RW = 42.6%) in explaining change-oriented citizenship performance. Specifically, plasticity traits (RW = 42.1%) are more important than stability traits (RW = 15.3%),

TABLE 8 Meta-analytic regression results and relative importance of Big Five personality traits and CQ factors as predictors of performance outcomes.

	Task performance			Affiliative citizenship performance			Change-oriented citizenship performance		
Variables	**Model 1**	**Model 2**	**RWs**	**Model 1**	**Model 2**	**RWs**	**Model 1**	**Model 2**	**RWs**
Openness to experience	.06**	−.06**	1.20%	−.11**	−.23**	5.50%	.12**	.07**	12.40%
Extraversion	.05**	.01	1.30%	.17**	.12**	6.70%	.19**	.18**	29.60%
Conscientiousness	.24**	.21**	19.50%	.27**	.26**	21.80%	.11**	.10**	11.20%
Agreeableness	−.02*	−.07**	1.10%	.05**	−0.01	2.70%	−.03*	−.05**	1.30%
Emotional stability	−0.01	−0.01	0.70%	.02	.00	2.40%	.01	.00	2.80%
Metacognitive CQ		.21**	27.70%		.04	10.40%		.13**	17.90%
Cognitive CQ		.05**	11.20%		−.03*	4.30%		.02	6.60%
Motivational CQ		.08**	14.40%		.29**	24.10%		.04	10.60%
Behavioral CQ		.15**	22.90%		.22**	21.90%		.03	7.60%
Adjusted R^2	.07	.21		.13	.30		.09	.12	
ΔR^2		.14**			.17**			.03**	
Relative importance									
Big Five traits			23.90%			39.20%			57.40%
Cultural intelligence			76.10%			60.80%			42.60%

Note: N (Harmonic mean) = 3666. Effects sizes are standardized regression coefficients. RWs = Relative weights (in % of R2).
*$p < .05$, and **$p < .01$.

TABLE 8 (Continued)

	Adaptive performance			Creative performance		
Variables	**Model 1**	**Model 2**	**RWs**	**Model 1**	**Model 2**	**RWs**
Openness to experience	.00	−.13**	3.60%	.22**	.07**	8.60%
Extraversion	.02	−0.03	1.00%	.08**	.03	3.30%
Conscientiousness	.04**	.02	1.50%	.07**	.05**	2.40%
Agreeableness	.02	−0.02	0.60%	.00	−.05**	0.80%

TABLE 8 (Continued)

	Adaptive performance			Creative performance		
Variables	**Model 1**	**Model 2**	**RWs**	**Model 1**	**Model 2**	**RWs**
Emotional stability	.14**	.13**	10.40%	.02	−0.01	
Metacognitive CQ		.13**	22.80%		.22**	28.50%
Cognitive CQ		.09**	15.70%		.04*	12.30%
Motivational CQ		.14**	21.50%		.25**	30.60%
Behavioral CQ		.14**	23.00%		.03	12.80%
Adjusted R^2	.03	.16		.09	.26	
ΔR^2		.13**			.17**	
Relative importance						
Big Five traits			17.10%			15.80%
Cultural intelligence			82.90%			84.20%

Note: N (Harmonic mean) = 3666. Effects sizes are standardized regression coefficients. RWs = Relative weights (in % of R2).
*$p < .05$, and **$p < .01$.

with extraversion (RW = 29.6%) being the most important plasticity trait for change-oriented citizenship performance. Among the CQ factors, metacognitive CQ (RW = 17.9%) is particularly important, followed by motivational CQ (RW = 10.6%).

For adaptive performance, CQ explained 13% of variance over and above the 3% explained by personality. CQ was also overall a more important predictor than personality (RWs = 82.9% vs 17.1%), with stability traits (RW = 12.5%) more important than plasticity traits (RW = 4.6%). All four CQ factors are similarly important (RWs = 15.7–23.0%), whereas emotional stability (RW = 10.4%) is the most important stability trait.

Finally, for creative performance, CQ explained 17% of variance over and above the 9% explained by personality. CQ was also overall a more important predictor of creative performance than personality (RWs = 84.2% vs 15.8%). Plasticity traits (RW = 11.9%) are more important than stability traits (RW = 3.9%), with openness to experience (RW = 8.6%) being the most important plasticity trait for creative performance. Among the CQ factors, motivational CQ (RW = 30.6%) and metacognitive CQ (RW = 28.5%) are the most important predictors of creative performance.

DISCUSSION

Our meta-analysis offers an elegant test and a novel interpretation of the structural relationships among the Big Five, CQ, and job performance based on DeYoung's (2015) CB5T. By focusing on the two broadest personality dimensions (stability and plasticity) that reflect two fundamental human systems for coping with uncertainty, our meta-analysis yields a discernibly clearer pattern of findings concerning personality, CQ, and performance than prior research. Specifically, evidence based on 109 samples (N = 24,552) shows that the plasticity metatrait is positively and significantly associated with CQ, whereas the stability metatrait is not significantly related to CQ. In addition, CQ not only consistently predicted five job performance outcomes (task performance, affiliative citizenship performance, change-oriented citizenship performance, adaptive performance, and creative performance) but also mediated positive effects of the plasticity metatrait on these outcomes. Finally, controlling for CQ revealed significant suppressor effects for relationships of the plasticity metatrait with task performance, affiliative citizenship performance, and adaptive performance. Our findings show that plasticity has significant and positive indirect effects via CQ but negative direct effects on task performance, affiliative citizenship performance, and adaptive performance.

Theoretical implications and future research

Our meta-analysis provides three theoretical implications. First, we contribute to the literature on CQ antecedents by offering a parsimonious explanation for how personality traits relate to CQ. Although past research has focused on theorizing relationships between specific Big 5 personality traits and CQ (Ang et al., 2006; Presbitero, 2016; Şahin et al., 2014), our research demonstrates that focusing on the broader stability and plasticity metatraits not only offers more parsimonious theorizing but also surfaces intriguing patterns of results between personality and CQ. Importantly, the CB5T offers a set of cogent explanations, rooted in the neurobiological bases of personality, to explain why the metatraits of stability and plasticity relate to CQ. Drawing on CB5T, our findings suggest that CQ is a set of characteristic adaptations that

stem from a reward-based approach to uncertainty in the environment that encourages exploration and learning of cross-cultural differences.

Given that the serotonergic and dopaminergic systems co-exist within individuals, future research could build on our work and explore configurations of stability/plasticity to examine how the two metatraits jointly relate to CQ. Such research would also contribute to establishing the generalizability of interaction effects among personality traits in predicting CQ, such as the interaction between agreeableness (stability) and openness (plasticity) found by Li et al. (2016). Future studies could also leverage recent advances in neuroscience to empirically test the neurobiological mechanisms that explain why personality affects CQ. This could include measuring levels of dopamine and serotonin and examining their effects on learning under conditions of uncertainty (Frank & Seaman, 2023).

Interestingly, we found that among the three stability traits, agreeableness contributes the most unique variance to CQ (14.1%), compared to conscientiousness (6.2%) and emotional stability (3.1%). This finding underscores the social nature of CQ. Agreeable individuals, in their quest for social stability, are more likely to acquire CQ because of their tendency to take perspective and empathize with others.

Second, we contribute to the broader literature on personality and performance by casting a new light on the plasticity metatrait and its importance for job performance. Personality scholars have consistently concluded that stability traits (especially conscientiousness and emotional stability) are more important for work performance. By contrast, openness to experience "consistently reported the lowest average true score correlations across criteria and occupational groups" (Barrick et al., 2001, p. 21). In a recent second-order meta-analysis of 101 original meta-analyses, He et al. (2019) similarly reported that stability traits are more predictive of a myriad of job performance outcomes, with validity estimates ranging from 0.14 (for emotional stability) to 0.22 (for conscientiousness), compared to plasticity traits (0.08 for openness and 0.07 for extraversion).

Our findings question this general conclusion and highlight that the importance of stability versus plasticity metatraits depends on the nature of the performance outcome. For outcomes that imply a degree of change, such as change-oriented citizenship performance and creative performance, plasticity traits are stronger predictors than stability traits. Thus, our findings suggest a potential dark side of the stability metatrait. It is plausible that the stability metatrait inhibits change and innovation because the preference for predictability and getting along (Hogan, 1983) constrains the extent to which these individuals will explore new ideas and break established norms and rules (e.g., Feist, 1998; George & Zhou, 2007). Future research could further expand the criterion domain of job performance based on the stability/plasticity distinction. For example, future research may wish to examine the differential relationships of stability versus plasticity metatraits with reactive versus proactive forms of adaptive performance (Huang et al., 2014), prohibitive versus promotive forms of voice (Maynes & Podsakoff, 2014), or operations management versus change leadership (Kotter, 1996).

Third, our discovery of suppressor effects for the plasticity metatrait offers an opportunity to advance future theorizing. Our findings show that plasticity has significant and positive indirect effects via CQ but negative direct effects on task performance, affiliative citizenship performance, and adaptive performance. Such inconsistent mediation models arising from the presence of suppressors (Davis, 1985; MacKinnon et al., 2000) can lead to misleading conclusions when left unpacked. For instance, the widespread meta-analytic conclusion that the plasticity metatrait is less important for job performance misses its relevance for CQ, which, in turn, is a critical predictor of performance in today's multicultural workplace. By modeling CQ as a proximal mechanism, we reveal the hidden indirect effects of the plasticity metatrait.

We urge future research to investigate the observed suppressor effects of plasticity, which suggests that the plasticity metatrait affects job performance through multiple and opposing pathways. For instance, DeYoung (2015) notes that for high plasticity individuals, "even a seemingly minor anomaly may provide motivation to explore, to put currently operative plans on hold in order to formulate some new interpretation or strategy or even a new goal" (p. 49). Thus, a potential theoretical mechanism that explains the negative effect of plasticity could be the capacity for focused and consistent goal-striving efforts. Future research could explore these alternative explanations and identify boundary conditions that may dampen the negative effects of plasticity on job performance. One potential moderator is temporal work design, such as increasing the temporal predictability of tasks (Zhao et al., 2022). By setting clear expectations about the start and end time of a task, the tendency for high plasticity individuals to be distracted by novel stimuli could be dampened.

At the same time, because CQ does not mediate stability effects and only partially mediates plasticity effects, other characteristic adaptations are likely to explain further the effects of stability and plasticity traits on performance outcomes. These may include other capabilities (e.g., emotional intelligence, Joseph & Newman, 2010), specific habits (e.g., Hagger et al., 2023), or leader (LMX) and team-member (TMX) relationships (e.g., Kamdar & Van Dyne, 2007). Thus, future research should study these alternative mediators alongside CQ to better explain the effects of stability and plasticity on performance outcomes.

Limitations and future directions

Because meta-analyses accumulate knowledge based on available primary studies, we acknowledge two limitations in our study. First, we urge future research to test the generalizability of our findings and uncover potential boundary conditions to the relationships between stability/plasticity traits and CQ. One important boundary condition is the social environment. Individuals who grow up in multicultural families or societies are more likely to acquire CQ to adapt to life circumstances. This suggests that the effects of plasticity traits on CQ may be weaker for these individuals.

Second, we coded performance outcomes based on the measures and items used in each study. We thank an anonymous reviewer for highlighting that there could be an overlap in the types of performance. This could be because of differences in the nature of participants' jobs, for example, task performance of a creative designer may be inherently creative. We focused on study measures and did not code for different role requirements (a) because CQ studies do not report these consistently and (b) to be consistent with prior meta-analyses of personality with different performance outcomes. Future research may wish to explore stability versus plasticity requirements of different job roles as a boundary condition more explicitly.

Practical implications

As we noted at the outset, globalization has profoundly shaped the nature of work, such that even domestic organizations must increasingly deal with global competitors and manage a culturally diverse workforce. Results from our meta-analysis have several important practical implications for talent selection and development in both global and domestic organizations. First, the incremental predictive validity of CQ over and above personality traits underscores

the importance of CQ. Organizations could complement personality assessments with CQ assessment tools, such as the Cultural Intelligence Scale (CQS; Ang et al., 2007), for selection. Given that CQ is a malleable capability, organizations could also invest in developing CQ in their employees.

Second, our finding that the plasticity metatrait is more strongly related to CQ than the stability metatrait suggests that organizations could (re)consider the importance of openness to experience and extraversion. Recruiting managers often emphasize traits such as conscientiousness and emotional stability during selection because of their greater predictive validity in job performance. Our meta-analysis casts a new light on the less frequently considered traits of openness and extraversion, particularly because diversity and change permeate today's work environment.

Third, our findings on the suppressor effects of plasticity suggest that organizations could explore work design interventions to compensate for the potential dark side of the plasticity metatrait. Specifically, individuals high in the metatrait of plasticity may tend to seek novelty and learning that is not necessarily related to their job or engage in excessive risk-taking that is detrimental to job performance. Organizations could mitigate such behaviors and ensure the alignment of employees' behaviors with their work goals through formal or informal controls. Formal controls include standardization and monitoring of behaviors or goals that require strict adherence, whereas informal controls include cultural norms that emphasize a results orientation.

CONCLUSION

Employees in multicultural settings inherently face more uncertainties at work. Drawing on CB5T, our meta-analysis explains why personality metatraits (stability and plasticity) affect job performance via CQ—a set of characteristic adaptations that are shaped by individuals' responses to environmental uncertainty. While numerous personality meta-analyses have consistently found that the constituent traits of stability (conscientiousness, agreeableness, and emotional stability) are more predictive of job performance than those of plasticity (openness to experience and extraversion), our research shows a contrarian picture, where the plasticity metatrait exerts an important indirect effect on job performance via CQ.

CONFLICT OF INTEREST STATEMENT

We have no known conflict of interest to disclose.

DATA AVAILABILITY STATEMENT

A complete list of all meta-analytic coding of primary articles and analyses code is provided on the Open Science Framework (OSF; https://osf.io/xjdqu/?view_only=75b5bee1eb5246928c89252e9fe81e05).

ETHICS APPROVAL

This study includes only secondary data and did not require IRB approval at our institution. This study was not pre-registered, and we report details of our literature search, paper inclusion and coding, and coding as part of our methods.

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