Situation Contingent Units of Personality at Work*

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# Situation Contingent Units of Personality at Work


## Abstract

Conscientiousness and neuroticism were studied as situation contingencies in a sample of 124 managers. Experience sampling measures of situational characteristics, state conscientiousness and state neuroticism were collected before, during and after the performance of a range of tasks completed in an executive training program of five 3-day sessions, conducted over two years. Six months following training, supervisor ratings of participants' job performance were also collected. For all variables the majority of variability was observed at the within-person level, justifying further analysis of within-person effects. Situation contingencies were operationalized as regression slopes calculated for each individual within an MLM analysis framework. The six situation contingencies considered in the current study varied between individuals. Three of the six situation contingencies were predictive of supervisor ratings of job performance providing first evidence of the predictive validity for situation contingencies. Combined with previous findings, the current study suggests that further research on situation contingencies and their effects is justified. Suggestions for the choice of situational properties and personality states, and practical applications of situation contingencies are discussed.

Research employing the trait approach, particularly the five-factor model (FFM; Costa & McCrae, 1999), has made many important contributions to our knowledge of the role of personality at work, including evidence for relationships between personality and job performance (e.g., Barrick & Mount, 1991), job satisfaction (e.g., Judge, Heller, & Mount, 2002) and leadership (e.g., Judge, Bono, Ilies, & Gerhardt, 2002). In this research, traits are viewed as relatively invariant person factors that describe differences *between* people in their typical cognitive, affective and behavioural responses; an approach that effectively ignores variation in personality responses *within* individuals. Studies of within-person variation in personality responses ask (a) whether they are systematically related to the properties of situations rather than random, and (b) whether the measure of the situation contingency has any predictive value over and above that provided by traits.

Researchers have coined the term 'personality states' to refer to specific occurrences of cognitive, affective and behavioural responses in a particular context and moment in time that have similar content to the corresponding personality traits (Fleeson, 2001). Studies have established that personality states are systematically related to the properties of situations, and that the strength of that relationship varies between individuals. For example, Fleeson (2007) found that levels of displayed extraversion were contingent upon perceived friendliness of the situation, and that the responsiveness to situational friendliness varied across individuals, which was replicated by Huang and Ryan (2011).

Studies to date have established that situation contingencies are measurable and stable individual differences[1], that can supplement the trait approach (Judge, Simon, Hurst, & Kelley, 2014; Minbashian et al., 2010; Huang & Ryan, 2011; Berenson, Downey, Rafaeli, Coifman & Paquin, 2011; Sherman, Nave, & Funder, 2010; Sherman et al., 2015), but there are two important gaps in the research. First, there are no published studies that demonstrate the predictive validity of the contingent units for a performance criterion. Minbashian et al. (2010) showed that the situation contingencies for conscientiousness were correlated with performance on a laboratory task, but the task was completed before the measures of the situation contingencies. Huang and Bramble (2016) also found a relationship between situation contingencies of conscientiousness and training success, but contingent conscientiousness was assessed using a one-off between-person measure and not based on cross situational within-person variation. Second, in all studies but one (Fleeson & Law, 2015), data have been collected in field settings, with no control of the ranges of situations that participants were exposed to during data collection. This matters as variability (or the lack thereof) in the situations participants encounter might account for the observed between-person differences in the situation contingencies.

[1] We have previously used the label 'task contingent unit' when referring to our operationalization of situation contingencies (e.g., Minbashian, et al, 2010). This was done to differentiate them from other domains of activity, such as the characteristics of social domains, which have been shown to evoke different contingent responses (see Fleeson, 2007). Tasks are a domain of activity that has been the subject of extensive research in psychology (Wood et al., 2011), which can be used to inform the study of situation contingencies. In other areas of psychology, differentiation of tasks and situations is considered critical to understanding individual differences in performance (Beckmann, Birney, & Goode, 2017; Beckmann, 2010; Birney, Beckmann, & Seah, 2016; Wood, 1986). The label situation contingency is adopted here to align our terminology with that of the taxonomy of Shermann, et al (2015). The reconciliation of domain based and taxonomic approaches to situations is an issue for later consideration.

This study makes two contibutions. First, it demonstrates the predictive validity of situation contingencies of personality for a real world measure of performance, i.e., supervisor ratings of job performance. A 6-month time lag between the predictor and criterion measures was chosen as it requires that the effects of contingent personality units be manifest over longer periods of time, similar to other traits. Many other studies have examined how situation contingencies are related to other variables (e.g., Minbashian, Wood, Beckmann, 2010; Pauletti, Cooper, & Perry, 2014; Sherman et al., 2015). However, to our knowledge, our paper is the first to report an association between a situation contingency and a lagged, field based performance measure. Second, through the use of common tasks in a laboratory setting, the study demonstrates that the measures of situational characteristics and personality states used to calculate the situation contingencies are not confounded with differences in the experiences of those participating in the study (see also Fleeson & Law, 2015; Sherman et al., 2015, p. 37). The current study controls for situations by collecting responses in a training program where participants were confronted with the same set of tasks of varying demands[2].

## Theory and Hypotheses Development

In the Cognitive Affective Processing System framework (CAPS; Mischel & Shoda, 1995), personality is viewed as a connectionist framework of interconnected units

[2] Note, that the process of centering scores reported in the analyses adjusts for between-person differences in the means of reported situation properties, but not for differences in their range or variability. The objective situational cues are the same for all participants. Between-person differences represent differences in the interpretations of situational demands, which is of main interest here.

of knowledge in which perceived situational characteristics are linked to cognitive, affective and behavioural responses (see Mischel & Shoda, 1995). These situation-response relationships are learned and stored in long-term memory in the form of 'if this, then that' contingent units (Mischel & Shoda, 1995). In the CAPS framework, contingent units do not only refer to situation-response contingencies but also include contingent relationships between cognitive, affective and behavioural responses (Mischel & Shoda, 1995). For example, a person may routinely adjust their goals or feelings of efficiacy in response to ups and downs in their emotional state, which may be the result of any number of different situational characteristics or intrapersonal factors.

CAPS is a meta-theoretical framework of basic principles for building domain-specific theories to be tested for predictive power (Mischel & Shoda, 1995, p. 16). The specific domain for the current study is that of tasks and the cognitive and emotional demands they place on individuals. Task demands refer to psychological characteristics of tasks, such as perceived difficulty, that are the product of the individual's encoding of objective task cues, such as dynamism or complexity (Mischel & Shoda, 1998; Rauthmann et al., 2014). We chose to focus on the conscientiousness and neuroticism responses to task demands because the associated traits are robust predictors of performance at work (Barrick & Mount, 1991; Barrick & Mount, 2000; Barrick, Mount & Judge, 2001) and, therefore, these responses provide strong tests of the additive value of situation contingencies in the prediction of performance.

## The Contingency of Conscientiousness and Neuroticism States on Task Demand

Within work environments, perceived level of task demand is a commonly encountered characteristic of tasks and is related to personality state indicators of conscientiousness, such as the levels and focus of effort, and neuroticism, such as stress and anxiety (Wood et al., 2011). Percieved task demand is generalizable because it is an experienced characteristic of all tasks, although the level varies as a function of task cues, such as complexity, novelty and structure, and person factors, such as experience, skill and self-efficacy (Wood, Beckmann & Birney, 2009). Characteristics of task demands that have been shown to impact on resource allocations and emotional reactions are difficulty, urgency (Minbashian et al., 2010; Cooper, Dewes & O'Driscoll, 2001) and importance (Gray & McNaughton, 2000). Individuals should display greater levels of conscientiousness and neuroticism when completing difficult, urgent and important tasks than when completing easy, non-urgent or unimportant tasks. State conscientiousness, for example, has been shown to increase as tasks become more demanding (Fleeson, 2007; Minbashian et al., 2010; Huang & Ryan, 2011), an effect that has not been observed with other situational characteristics such as the perceived friendliness of others (Fleeson, 2007).

*Conscientiousness* includes a range of motivational tendencies and behavioural responses that facilitate work performance, including orderliness, achievement orientation, goal striving and self-discipline (see Costa & McCrae, 1992; Roberts, Chernyshenko, Stark, & Goldberg, 2005). As tasks become more demanding, the potential benefits of the task-facilitation properties of conscientiousness will also

increase. However, as discussed later, individuals will vary in their responsiveness to task demands.

*Hypothesis 1a:* Within-person variability in state conscientiousness will be contingent on within-person variability in task demand; state conscientiousness will, on average, be higher when tasks are perceived as more demanding and lower when tasks are perceived as less demanding.

*Neuroticism* incorporates a range of negative emotions that have been shown to be responsive to changes in task demands (Suls & Martin, 2005). As tasks become more urgent, difficult and important, perceived workload and perceived pressure will increase, which are both positively related to negative emotional responses included in neuroticism, such as stress, frustration and anxiety (Cooper et al., 2001). While individuals will vary in their emotional responsiveness to task demands, the average relationship is expected to be positive.

*Hypothesis 1b:* Within-person variability in state neuroticism will be contingent on within-person variability in task demand; state neuroticism will, on average, be higher when tasks are perceived as more demanding and lower when tasks are perceived as less demanding.

A situation contingency can only be considered a personality unit if individuals differ from each other in their responses to the same situational cues (Fleeson & Noftle, 2008). Previous research has established individual differences in contingent

relationships between situational characteristics[3] and Big Five personality states (Minbashian et al., 2010; Huang & Ryan, 2011; Fleeson, 2007; Sherman et al., 2015). Thus, we expect that participants will differ in their levels of responsiveness to changes in task demands for both state conscientiousness and state neuroticism.

While the personality states of conscientiousness and neuroticism are conceptually related to the same traits, states and traits differ in how they are expressed over time and across different contexts. The CAPS model does not preclude the potential effect of traits on states, but because we argue that situation-contingent responses form a meaningful aspect of personality, it is essential to establish that situation contingencies operate independently of their related traits and are distinguishable from states as such.

*Hypothesis 2a:* Within-person variability in state conscientiousness will be contingent on within-person variability in task demand after controlling for the effect of trait conscientiousness (additive model). The within-person task demand state conscientiousness relationship will not vary by levels of trait conscientiousness (multiplicative model).

*Hypothesis 2b:* Within-person variability in state neuroticsm will be contingent on within-person variability in task demand after controlling for the effect of trait neuroticism (additive model). The within-person task demand state neuroticsm relationship will not vary by levels of trait neuroticsm (multiplicative model).

[3] Whilst other researchers have referred to psychological 'properties' of situations (e.g., Minbashian et al., 2010), we adopt the term 'characteristics' to align with recent taxonomies of situations (e.g., Rauthmann et al., 2014).

## Situation contingencies as Predictors of Job Performance

Situation-contingent conscientiousness (SCC) is an adaptive strategy in the allocation of limited human resources. Many aspects of state conscientiousness are highly functional when responding to difficult, important and urgent tasks because they create a strategic, structured manner of working under pressure that enables scarce cognitive resources to be focused on the task, particularly when tasks require adaptive responses. Individuals who respond contingently (as opposed to habitually and maximally expressing conscientious behaviours across time and contexts) can conserve resources on less demanding tasks and might have more resources at their disposal for successfully completing difficult, important and urgent tasks.

*Hypothesis 3a:* Situation-contingent conscientiousness will positively predict supervisor ratings of job performance after controlling for trait conscientiousness.

Situation-contingent neuroticism (SCN) is more likely to be maladaptive. Neurotic emotional states, such as anxiety, self-consciousness and vulnerability, can deplete or detract from the limited cognitive resources available for the performance of cognitive functions, such as attention, flexibility and working memory, that are needed to respond effectively to highly demanding tasks (Kahneman, 1973). Thus minimising neurotic responses can be a strategic and effective method of coping with cognitively demanding tasks, such as those that require adaptive responses. Because employees are judged on how they perform in the face of high task demands, emotional responses that undermine performance are expected to negatively influence supervisor ratings.

*Hypothesis 3b*: Situation-contingent neuroticism will negatively predict supervisor ratings of job performance after controlling for trait neuroticism.

## Method

### Overview and procedure

The study was part of a long-term training and development program for mid-level, high potential managers from five companies in the insurance, banking, packaging, airline and broadcasting industries. The managers completed a series of training tasks (simulations, lectures, presentations, cognitive assessments, feedback and outdoor activities) during each of five 3-day training sessions that were spread over two years. Baseline measures, including the conscientiousness and neuroticism scales, and demographic information were collected at the beginning of the first session. Experience sampling measures were collected on 30 occasions over the study period and were linked to tasks performed during different sessions. The task types remained the same or similar from session to session. Supervisor ratings of job performance were collected 6 months after completion of the training. All measures were collected on computers.

### Participants

Participants were 131 managers (41 women and 88 men; two did not state their gender) with an average age of 35.67 years ($SD$ = 6.62), 6.17 years ($SD$ = 4.94) of management experience and who had completed either a high school ($n$ = 16), undergraduate ($n$ = 52) or postgraduate ($n$ = 46) education. Fifteen participants reported

having completed a different degree ('other'), and two did not report their level of education at all. Complete data were available for 124 participants, which comprise the sample of the current study.

## Measures

### Experience Sampling Measures (ESMs)

The ESMs included 4 items for state conscientiousness, 7 items for state neuroticism, and 3 items for task demand (see Appendix). The items for state conscientiousness and neuroticism were chosen to represent the trait domains (Costa & McCrae, 1992) and relevant descriptors of reactions to tasks. The answer format for all items was a visual analogue scale. Each item was responded to on a slider scale from 'not at all' (scored as 0) to 'extremely' (scored as 100). Items were averaged to provide the state conscientiousness ($\alpha_{between\text{-}person} = .82$; $\alpha_{within\text{-}person} = .70$), and state neuroticism ($\alpha_{between\text{-}person} = .90$; $\alpha_{within\text{-}person} = .84$) scores for each measurement occasion[4]. The three task characteristics (task urgency, task difficulty, task importance) were analysed separately due low internal consistency of the task demand scale ($\alpha_{between\text{-}person} = .30$; $\alpha_{within\text{-}person} = .40$). We refer to these as task demand characteristics. Responses were collected on 2834 measurement occasions, on average 23 occasions per participant for an average response rate of 77%.

[4] Within-person reliability analyses: Cronbach's alpha was calculated based on ipsatized scores (i.e., each participant's mean was substracted from each of their item responses, effectively controlling for between-person variability in item responses). An alternative approach is to calculate Cronbach's alpha for the scale separately for each person across occasions and then produce an average alpha coefficient. When this was done the following internal consistencies were observed: Conscientiousness: $\alpha_{within\text{-}person} = .63$; Neuroticism: $\alpha_{within\text{-}person} = .76$.

Trait conscientiousness and trait neuroticism

Participants completed a baseline measure of the NEO Personality Inventory (Goldberg, 2010). The items were responded to on a visual analogue scale from 'very inaccurate' (scored as 0) to 'very accurate' (scored as 100). The 10 items for the conscientiousness and neuroticism scales were averaged to obtain scores for trait conscientiousness ($\alpha = .89$) and for trait neuroticism ($\alpha = .86$).

Job performance

Supervisor ratings of performance (10 items; $\alpha = .94$), included assessments of performance outcomes ('displays a high level of job performance', 'has a high level of productivity', 'consistently produces high-quality work') and work behaviors ('demonstrates high levels of flexibility in his or her problem solving', 'approaches problems and situations from multiple, diverse perspectives', 'identifies innovative approaches or solutions to problems') on a visual analogue scale from 'not at all accurate' (scored as 0) to 'extremely accurate' (scored as 100).

Data Analysis

We started with a correlation analysis, followed by three-level MLM analyses using *R* (Core Team, 2017). In our model, items (level 1) were nested within occasions of measurement (or experience sampling measures, level 2), which were nested within people (level 3). The purpose of a three-level MLM was to model the states as latent

constructs, including a measurement model at level 1 to account for measurement error (see Raudenbush & Bryk, 2002, p. 346).

We operationalised the situation contingencies as the regression slopes ($\gamma_{010}$) for the relationship between an individual's perceived task characteristics (IV) and their situational responses (DVs) for conscientiousness and neuroticism. Separate analyses were run for each task characteristic (i.e., task importance, task difficulty, task urgency). First, the total variability in state conscientiousness and state neuroticism were each partitioned into three components: (a) variability between individuals in latent states, (b) variability within individuals in latent states, and (c) error variance (unconditional models, Table 2). We also examined the variability in the three task demand characteristics by partitioning the variability in task urgency, task difficulty and task importance into two components each, variability within individuals and variability between individuals (unconditional models, Table 2). Second, to examine the situation contingencies predicted in hypotheses 1a and 1b, we conducted random-coefficients regression analyses in which we entered one of the three task variables (centred around each individual's mean) as an independent variable at Level 2. The Level 2 intercepts and slopes were allowed to vary randomly at Level 3 (Model 1). This provided the estimates of between-person variability in the slopes (i.e., situation contingencies) and allowed us to establish whether the between-person variability in the slopes justified their status as individual differences variables. These analyses were repeated including the trait measures of conscientiousness or neuroticism, respectively, as control variables at level 3, to provide tests of hypotheses 2a and 2b (Model 2). We also included cross-level

interaction effects (Model 3) to explore whether the respective traits explain between-person differences in the situation contingencies (i.e., slopes). The MLM equations are presented in Tables 2 and 3. All analyses were conducted using R version 3.3.2 and Linear Mixed Effects (LME) modelling was performed using the lme4 (Bates, Maechler, Bolker, & Walker, 2017) and lmerTest (Kuznetsova, Brockhoff, & Christensen, 2016) packages. We report standardized regression coefficients and 95% confidence intervals to assist with evaluation of effect sizes.

Finally, to test hypotheses 3a and 3b, the individual slope estimates (saved from the MLM analysis, Model 1, see Table 3) were then included in an OLS regression analysis as predictors of job performance ratings, controlling for the respective trait and mean state effects in a stepwise approach (see Table 4, steps 1, 2 and 3). The mean state variables included in the analyses shown in Table 4 were the intercepts saved from the unconditional MLM analysis as reported in Table 2.

## Results

Table 1 presents the means, standard deviations and between-person correlations for the main study variables. Several points can be noted about the pattern of results. The state measures were correlated with their respective IPIP trait measures (conscientiousness$_{\text{trait-state}}$: $r$ = .33; neuroticism$_{\text{trait-state}}$ $r$ = .27) providing some evidence for their validity. Conscientiousness and neuroticism variables were negatively correlated at both the trait ($r$ = -.24) and state levels ($r$ = -.40). Two of the six situation contingencies (SCC-urgency, SCN-urgency) were correlated with their respective traits (SCC-urgency:

*r*= -.20, and SCN-urgency: *r* = .21). Three situation contingencies were correlated with job performance. A positive correlation was observed for SCC-difficulty with job performance (*r* = .20), whilst negative correlations with job performance were observed for SCN-urgency and SCN-difficulty. Note that, on average, participants reported to be highly conscientious and emotionally stable, and received high performance ratings from their supervisors.

[Insert Table 1]

Table 2 presents the results of the fully unconditional MLM analyses. Within-person variability across different tasks and time accounted for 54% of the total variability in state conscientiousness. Similarly, for state neuroticism within-person variability accounted for 58% of the total variability. Thus, as required, individuals displayed substantial variability in their conscientiousness and neuroticism states when working on different tasks during the training program. For the three task demand characteristics, the majority of the variability was observed at the within-person level accounting for 83%, 81% and 59% of the total variability in task urgency, task difficulty and task importance, respectively. This indicates that tasks were perceived as varying across the study period in terms of at least three characteristics (urgency, difficulty and importance).

[Insert Table 2]

Identifying Situation contingencies

Of the three task demand characteristics, only task importance was significantly and positively related to state conscientiousness (β = .29, see Model 1 in Table 3a). Task importance was also significantly related to state neuroticism, though the effect was

smaller in size and in the opposite direction than expected (β = -.10). Task urgency and task difficulty, were, as expected, significantly and positively related to state neuroticism (β = .23, and β = .27, resp., see Table 3b). The slopes generated from these analyses are the situation contingencies that describe the extent to which individuals systematically adapt their momentary states in response to perceived task demands (see Table 3 footnote for the equations). State conscientiousness increased when tasks were perceived as more important (but not when tasks were perceived as more urgent or difficult). State neuroticism increased when tasks were perceived as more urgent and difficult, but decreased when tasks were perceived as more important, though the latter effect was much smaller. Overall, the effects were small to moderate in size.

[Insert Table 3a and 3b]

Between-Person Differences in Situation Contingencies

Before conducting tests for hypotheses 2a and 2b, we first established that there was between-person variability in scores for the situation contingencies. Figure 1 shows the distributions of the six situation contingencies (i.e., slopes from the MLM analyses). To further clarify the nature of the between-person differences, we estimated the plausible range of slopes that fell within 95% of the typical slope (i.e., ± 1.96 *SD*). Slopes for SCC ranged from -0.17 to 0.22 for task urgency and from -0.19 to 0.14 for task difficulty, indicating that increases in task urgency and/or difficulty were associated with an increase in state conscientiousness for some participants and a decrease for others. For task importance, typical slopes ranged from 0.16 to 0.67 indicating a positive relationship between task importance and conscientiousness for most participants. For

SCN, the slopes that fell within 95% of the typical slope ranged from 0.07 to 0.38 for task urgency and from 0.10 to 0.43 for task difficulty, indicating that for the vast majority of individuals an increase in task urgency and/or task difficulty was associated with an increase in state neuroticism. For task importance, the typical slopes ranged from -0.45 to 0.12 suggesting that for many, but not all, participants increases in task importance were associated with decreases in state neuroticism. Reliabilities of the situation contingencies are reported in Table 1.

Hypotheses 2a and 2b were generally supported. The within-person task demand state conscientiousness relationships remained unchanged when controlling for trait conscientiousness in the model (see Model 1 vs Model 2 in Table 3). Equally, the within-person task demand state neuroticism relationships remained unchanged when controlling for trait neuroticism in the model (see Model 1 vs Model 2 in Table 3). In order to further explore our findings we also tested the effect of trait conscientiousness on the SCC units and trait neuroticism on the SCN units (i.e. whether the situation-state relationships were moderated by the respective trait, see Model 3 in Table 3). Interactions were non-significant for the three SCC units, and for two of the 3 SCN units. Note, whilst the interaction was significant for SCN-urgency, this effect was very small (β=.03). Taken together these findings suggest that the SCC and SCN units operate largely independently of the respective traits.

Situation contingencies as Predictors of Job Performance

Three of the six situation contingencies were significantly related to supervisor ratings of job performance collected six months after the training programme (see Table

4). SCC-difficulty positively predicted job performance (β = .20), whilst SCN-urgency (β = -.26) and SCN-difficulty (β = -.24) both negatively predicted job performance after controlling for the respective traits. Note, findings remained unchanged when we included the respective mean state in the analysis to control for between-person state level differences (see Table 4, step 3).

## Discussion

The present study makes two contributions to the still relatively small body of studies of situation contingencies at work. First is the demonstration that situation contingencies predict subsequent performance on a commonly used rating measure in a field setting. Second, we added to the construct validity of situation contingencies by collecting ESMs for a common set of tasks in an executive training program, thus ensuring that the measures of situation contingencies were not confounded by differences in work experiences of participants.We also demonstrated that individual differences in the situation contingencies for conscientiousness and neuroticism were activated by the same psychological characteristics of situations, specifically task demands, but had different effects on performance for a group of high performing professionals with considerable work experience, as distinct from student based samples.

The results of the current study highlight the potential for situation contingencies as a supplement to traits in the study of personality. Significant between-person differences in situation contingencies have now been demonstrated across work,

executive training and university contexts. The prediction of performance ratings over a 6-month period in the current study supports the Mischel and Shoda (1995) argument that “if this, then that”, contingent units such as the situation contingencies in this study, are stable and meaningful units of personality and deserve further research attention alongside the ongoing study of traits.

Studies of the FFM have provided useful inputs for staffing decisions such as selection, promotion and talent identification. Situation contingencies should prove more useful for developmental and coaching interventions because they enable targeting of both the situation and the response. The formation of implementation intentions based on the ‘if this, then that’ coupling of situation contingencies has been shown to increase the incidence of intended behaviors (Mischel, 2014). For example, a contingent unit score might be used to identify the situation triggers that lead to stress or anxiety and strategies tailored to managing those triggers.

## Future Research

Findings to date suggest that situation contingencies are meaningful and relevant units of personality that operate independently of traits as traditionally understood. However, more research is needed before the accumulated body of knowledge is sufficient to reach the types of conclusions that are made about other traits, particularly the Big Five. Researchers planning to study situation contingencies will need to decide what kind of responses and what situational characteristics to study. An initial focus on the study of situation contingencies related to the FFM traits will enable researchers to build on and extend an established body of knowledge about personality at work.

Another consideration is the properties of situations that are measured and related to the cognitive, affective and behavioral responses of situation contingencies. While people at work are moved to action by certain events, such as tasks, feedback, incentives and social interactions (Karoly, 1993), the lack of a systematic description of situations has meant that the accumulation of knowledge within and across different situational domains has, to date, been haphazard (Wood et al., 2011). Recent developments provide a possible solution. Rauthmann et al. (2014) provide a taxonomy and measure of situations, the Situational Eight DIAMONDS, that was based on the Riverside Situational Q Sort (Sherman, Nave, & Funder, 2010) and aims to encompass most situations people might encounter in daily life. The DIAMONDS dimensions are psychologically relevant situation characteristics rather than more objective situation descriptors or cues (such as how many people are present in a situation), and include Duty, Intellect, Adversity, Mating, pOsitivity, Negativity, Deception, and Sociality. Similarly, Parrigon, Woo, Tay and Wang, (2017) have proposed a seven-dimensional taxonomy of psychological situations using a lexical approach that only partly overlaps with the DIAMONDS taxonomy. This includes Complexity, Adversity, Positive valence, Typicality, Importance, humOr and Negative valence under the acronym CAPTION.

Such taxonomies are very useful in that they provide a framework and language to communicate about a wide range of psychologically relevant situations and to accumulate results. However, a more fine-grained analysis of the situation at facet level (e.g. considering different facets of ‘duty’ or ‘sociality’) might be necessary to describe, explain and predict individual cognitive, affective and behavioral responses (see also

Beckmann & Wood, 2017). For instance, individuals might differ in terms of which facet(s) of 'duty' might trigger a conscientious response. In the current study we found that paticipants distinguished between task urgency, task difficulty and task importance in their assessments of the demands of the situation and their responses, which necessitated disaggregated analyses of the situation contingencies for each of the three characteristics of task demands.

The use of experienced managers and the use of actual measures of job performance are strengths of the current study but may also be a limitation. All participants were identified as having high potential relative to their peers. Like many high achievers, they showed limited variability in their levels of conscientiousness and tended to be rated as above average performers by their managers. Samples of individuals with a wider range of abilities and motivation may replicate previous findings of a relationship between contingent conscientiousness and performance outcomes (Minbashian et al., 2010; Huang & Bramble, 2016) in a design that allows inferences of predictive validity for situation contingencies.

## Conclusion

The current findings demonstate how situation contingencies provide individual difference measures that describe how individuals respond consistently to common situational properties over time and predict performance over and above related traits. This is the first study to demonstrate the predictive validity of situation contingencies and does so for a measure of "real world" outcome, i.e., judgments of job performance. Our

results are from a largely high-performing, conscientious and emotionally stable population. Although this may limit generalizability, it also suggests our results present rather conservative estimates of the effects. Situation contingencies have the potential for more targeted development and coaching interventions by providing individuals with feedback on both the properties of situations, their responses and how the two are related in either an adaptive or maladaptive way.

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# Appendix

Experience sampling items:

*State conscientiousness:*

'how hard are you working on this activity?' (task effort), 'how focused are you on this activity?' (task focus), 'how efficiently are you working on this activity?' (task efficiency), and 'how systematically are you approaching this activity? (task systematicity).

*State neuroticism:*

'how frustrated are you feeling right now?' (frustration), 'how self-conscious are you feeling right now?' (self-consciousness), 'how dissatisfied with yourself are you feeling right now?' (self-consciousness), ('how tense are you feeling right now?' (anxiety), 'how calm are you feeling right now?', (anxiety, reverse scored), 'how sad are you feeling right now?' (depression), and 'how stressed are you feeling right now?' (stress).

*Task demand:*

'how difficult is this activity for you?' (task difficulty), 'how much time pressure are you experiencing while performing this activity?' (task urgency), and 'how important is it for you that you complete this activity effectively?' (task importance).

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## Ethics

All procedures for the recruitment and treatment of participants in the current study were approved by the Ethics Committee of the UNSW.

Table 1: *Means, Standard Deviations and Between-Person Correlations Among Study Variables (N=124)*

| | | Unstandardized | | Standardized | | Correlation coefficients | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | | Mean | (SD) | Mean | 95% CI | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| SCC-U | (1) | 0.02 | (0.10) | 0.03 | -0.01 – 0.07 | 0.55 [b] | | | | | | | | | | |
| SCC-D | (2) | -0.02 | (0.09) | -0.03 | -0.06 – 0.01 | 0.43 ** | 0.59 [b] | | | | | | | | | |
| SCC-I | (3) | 0.41 | (0.13) | 0.29 | 0.25 – 0.32 | 0.06 | -0.22 * | 0.41 [b] | | | | | | | | |
| SCN-U | (4) | 0.23 | (0.08) | 0.23 | 0.21 – 0.26 | -0.22 * | -0.13 | 0.05 | 0.52 [b] | | | | | | | |
| SCN-D | (5) | 0.27 | (0.08) | 0.27 | 0.25 – 0.30 | 0.06 | -0.08 | 0.09 | 0.39 ** | 0.54 [b] | | | | | | |
| SCN-I | (6) | -0.16 | (0.14) | -0.10 | -0.13 – -0.06 | 0.21 * | 0.20 * | -0.25 ** | -0.12 | -0.31 ** | 0.30 [b] | | | | | |
| Trait C | (7) | 73.00 | (13.34) | | 70.61 – 75.29 [a] | -0.20 * | -0.01 | -0.03 | 0.03 | -0.13 | 0.03 | 0.89 | | | | |
| Trait N | (8) | 28.05 | (13.69) | | 25.67 – 30.47 [a] | -0.06 | 0.00 | -0.17 | 0.21 * | 0.13 | -0.06 | -0.24 ** | 0.86 | | | |
| State C | (9) | 69.24 | (8.45) | | 67.78 – 70.74 [a] | -0.50 ** | 0.04 | -0.14 | -0.13 | -0.17 | 0.02 | 0.33 ** | -0.05 | 0.82 | | |
| State N | (10) | 28.41 | (9.91) | | 26.66 – 30.14 [a] | 0.22 * | 0.06 | 0.12 | 0.17 | 0.54 ** | -0.21 * | -0.12 | 0.26 ** | -0.40 ** | 0.90 | |
| Job Performance | (11) | 75.14 | (11.94) | | 73.04 – 77.22 [a] | 0.00 | 0.20 * | -0.12 | -0.23 * | -0.22 * | 0.00 | -0.08 | 0.11 | 0.18 | -0.07 | 0.94 |

Notes:

SCC = Situation-contingent Conscientiousness; SCN = Situation-contingent Neuroticism; U = Task Urgency; D = Task Difficulty; I = Task Importance;

[a] bootstraped unstandardized estimates of 95% CI; * $p < .05$; ** $p < .01$; Between-subject reliability coefficients are reported on diagonal,

[b] reliability of contingency slopes are calculated according to Raudenbush & Bryk (2002, equation 3.58, p.49)

Table 2: *Results of the Fully Unconditional Analysis for Between- and Within-Person Variability in Latent State Conscientiousness and Latent State Neuroticism*

| Variance Component | Level | | Variance Estimate | % |
|---|---|---|---|---|
| Between-person conscientiousness ($\tau_\beta$) | 3 | person | 77.16 | 45.85% |
| Within-person conscientiousness ($\tau_\pi$) | 2 | occasion | 91.13 | 54.15% |
| Error ($\sigma^2$), conscientiousness | 1 | item | 247.07 | |
| Between-person neuroticism ($\tau_\beta$) | 3 | person | 105.80 | 41.52% |
| Within-person neuroticism ($\tau_\pi$) | 2 | occasion | 149.00 | 58.48% |
| Error (σ2), neuroticism | 1 | item | 348.70 | |
| Between-person task-urgency ($\tau_\beta$) | 2 | person | 131.40 | 17.10% |
| Within-person task-urgency ($\sigma^2$) | 1 | occasion | 636.90 | 82.90% |
| Between-person task-difficulty ($\tau_\beta$) | 2 | person | 146.00 | 18.58% |
| Within-person task-difficulty ($\sigma^2$) | 1 | occasion | 640.00 | 81.42% |
| Between-person task-importance ($\tau_\beta$) | 2 | person | 144.70 | 41.35% |
| Within-person task-importance ($\sigma^2$) | 1 | occasion | 205.20 | 58.65% |

*Notes.* (a) Level 1 model: $Y_{ijk} = \pi_{0jk} + e_{ijk}$, where $e_{ijk} \sim N(0, \sigma^2)$ and $Y_{ijk}$ is person *k*'s score on the state item *i* on occasion *j*. Level 2 model: $\pi_{0ijk} = \beta_{00k} + r_{0jk}$, where $r_{0jk} \sim N(0, \tau_\pi)$. Level 3 model: $\beta_{00k} = \gamma_{000} + u_{00k}$, where $u_{00k} \sim N(0, \tau_\beta)$.

Table 3a*: Results of the MLM Analyses for Conscientiousness*

| **Urgency** | **Model 1** | | | **Model 2** | | | **Model 3** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *b* | *CI* | *p* | *b* | *CI* | *p* | *b* | *CI* | *p* |
| **Fixed Parts** | | | | | | | | | |
| (Intercept) | 69.24 | 67.63 – 70.85 | <.001 | 69.22 | 67.69 – 70.75 | <.001 | 69.22 | 67.69 – 70.74 | <.001 |
| TD | 0.03 | -0.01 – 0.07 | 0.101 | 0.03 | -0.01 – 0.07 | 0.11 | 0.03 | -0.01 – 0.07 | 0.097 |
| Trait C | | | | 0.13 | 0.06 – 0.20 | <.001 | 0.15 | 0.07 – 0.22 | <.001 |
| TD x Trait C | | | | | | | -0.03 | -0.07 – 0.01 | 0.115 |
| **Random Parts** | | | | | | | | | |
| $ICC_{MO:user}$ | | 0.20 | | | 0.20 | | | 0.20 | |
| $ICC_{user}$ | | 0.19 | | | 0.17 | | | 0.17 | |
| $R^2$ / $\Omega_0^2$ | | .517 / .492 | | | .517 / .492 | | | .517 / .492 | |

| **Difficulty** | **Model 1** | | | **Model 2** | | | **Model 3** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *b* | *CI* | *p* | *b* | *CI* | *p* | *b* | *CI* | *p* |
| **Fixed Parts** | | | | | | | | | |
| (Intercept) | 69.24 | 67.62 – 70.85 | <.001 | 69.67 | 68.18 – 71.15 | <.001 | 69.22 | 67.69 – 70.74 | <.001 |
| TD | -0.03 | -0.06 – 0.01 | 0.115 | -0.03 | -0.06 – -0.01 | 0.005 | -0.03 | -0.06 – 0.01 | 0.117 |
| Trait C | | | | 0.13 | 0.06 – 0.21 | <.001 | 0.15 | 0.07 – 0.22 | <.001 |
| TD x Trait C | | | | | | | 0.00 | -0.04 – 0.03 | 0.856 |
| **Random Parts** | | | | | | | | | |
| $ICC_{MO:user}$ | | 0.20 | | | 0.20 | | | 0.21 | |
| $ICC_{user}$ | | 0.19 | | | 0.17 | | | 0.17 | |
| $R^2$ / $\Omega_0^2$ | | .518 / .493 | | | .517 / .492 | | | .518 / .493 | |

| **Importance** | **Model 1** | | | **Model 2** | | | **Model 3** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *b* | *CI* | *p* | *b* | *CI* | *p* | *b* | *CI* | *p* |
| **Fixed Parts** | | | | | | | | | |
| (Intercept) | 69.24 | 67.62 – 70.85 | <.001 | 69.35 | 67.85 – 70.86 | <.001 | 69.22 | 67.69 – 70.74 | <.001 |
| TD | 0.29 | 0.25 – 0.32 | <.001 | 0.26 | 0.24 – 0.28 | <.001 | 0.29 | 0.25 – 0.32 | <.001 |
| Trait C | | | | 0.14 | 0.07 – 0.21 | <.001 | 0.15 | 0.07 – 0.22 | <.001 |
| TD x Trait C | | | | | | | 0.00 | -0.04 – 0.04 | 0.917 |
| **Random Parts** | | | | | | | | | |
| $ICC_{MO:user}$ | | 0.13 | | | 0.14 | | | 0.14 | |
| $ICC_{user}$ | | 0.21 | | | 0.19 | | | 0.19 | |
| $R^2$ / $\Omega_0^2$ | | .492 / .476 | | | .494 / .478 | | | .491 / .476 | |

*Note*. Model 1 displays the random-coefficients regression analysis with the task demand variable entered as an independent variable at Level 2. Model 2 includes the intercept-as-outcome regression analysis with the trait as a predictor of the intercepts at Level 3. Model 3 includes the slope-as-outcome regression analysis with the trait as predictor of the slopes at Level 3. Level 1 model: $Y_{ijk} = \pi_{0jk} + e_{ijk}$. Level 2 model: $\pi_{0jk} = \beta_{00k} + \beta_{01k}$ x (task demand) + $r_{0jk}$. Level 3 model for random-coefficients regression analysis: $\beta_{00k} = \gamma_{000} + \mu_{00k}$ and $\beta_{01k} = \gamma_{010} + \mu_{01k}$. Level 3 model for intercept-as-outcome and slope-as-outcome analyses: $\beta_{00k} = \gamma_{000} + \gamma_{001}$ x (trait conscientiousness) + $\mu_{00k}$ and $\beta_{01k} = \gamma_{010} + \gamma_{011}$ x (trait conscientiousness) + $\mu_{01k}$. ,Parameter estimates are standardized. Traditional estimates of R2 have problematic interpretations due to the cross-level interaction of fixed and random effects. In response, a variety of pseudo R2 estimates have been proposed. The estimate reported here is as described by Nakagawa and Schielzeth (2013) and referred to there as omega-squared ($\Omega 2$). It is implemented in the R package sjstats (Lüdecke, 2017).

Table 3b: *Results of the MLM Analyses for Neuroticism*

| **Urgency** | **Model 1** | | | **Model 2** | | | **Model 3** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *b* | *CI* | *p* | *b* | *CI* | *p* | *b* | *CI* | *p* |
| **Fixed Parts** | | | | | | | | | |
| (Intercept) | 28.41 | 26.53 – 30.30 | <.001 | 28.41 | 26.59 – 30.23 | <.001 | 28.41 | 26.59 – 30.23 | <.001 |
| TD | 0.23 | 0.21 – 0.26 | <.001 | 0.23 | 0.20 – 0.26 | <.001 | 0.23 | 0.20 – 0.26 | <.001 |
| Trait N | | | | 0.11 | 0.04 – 0.19 | 0.004 | 0.11 | 0.04 – 0.19 | 0.003 |
| TD x Trait N | | | | | | | 0.03 | 0.00 – 0.06 | 0.035 |
| **Random Parts** | | | | | | | | | |
| $ICC_{MO:user}$ | | 0.19 | | | 0.19 | | | 0.19 | |
| $ICC_{user}$ | | 0.19 | | | 0.18 | | | 0.18 | |
| $R^2$ / $\Omega_0^2$ | | .489 / .479 | | | .489 / .479 | | | .489 / .479 | |

| **Difficulty** | **Model 1** | | | **Model 2** | | | **Model 3** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *b* | *CI* | *p* | *b* | *CI* | *p* | *b* | *CI* | *p* |
| **Fixed Parts** | | | | | | | | | |
| (Intercept) | 28.42 | 26.53 – 30.30 | <.001 | 28.42 | 26.59 – 30.24 | <.001 | 28.42 | 26.60 – 30.24 | <.001 |
| TD | 0.27 | 0.25 – 0.30 | <.001 | 0.27 | 0.25 – 0.30 | <.001 | 0.27 | 0.25 – 0.30 | <.001 |
| Trait N | | | | 0.11 | 0.04 – 0.18 | 0.004 | 0.11 | 0.04 – 0.19 | 0.003 |
| TD x Trait N | | | | | | | 0.01 | -0.02 – 0.04 | 0.46 |
| **Random Parts** | | | | | | | | | |
| $ICC_{MO:user}$ | | 0.17 | | | 0.17 | | | 0.17 | |
| $ICC_{user}$ | | 0.20 | | | 0.19 | | | 0.19 | |
| $R^2$ / $\Omega_0^2$ | | .486 / .477 | | | .486 / .477 | | | .486 / .477 | |

| **Importance** | **Model 1** | | | **Model 2** | | | **Model 3** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *b* | *CI* | *p* | *b* | *CI* | *p* | *b* | *CI* | *p* |
| **Fixed Parts** | | | | | | | | | |
| (Intercept) | 28.41 | 26.52 – 30.30 | <.001 | 28.41 | 26.59 – 30.23 | <.001 | 28.41 | 26.59 – 30.23 | <.001 |
| TD | -0.10 | -0.13 – -0.06 | <.001 | -0.10 | -0.13 – -0.06 | <.001 | -0.10 | -0.13 – -0.06 | <.001 |
| Trait N | | | | 0.11 | 0.04 – 0.19 | 0.003 | 0.11 | 0.04 – 0.19 | 0.003 |
| TD x Trait N | | | | | | | -0.01 | -0.04 – 0.03 | 0.748 |
| **Random Parts** | | | | | | | | | |
| $ICC_{MO:user}$ | | 0.23 | | | 0.23 | | | 0.23 | |
| $ICC_{user}$ | | 0.18 | | | 0.17 | | | 0.17 | |
| $R^2$ / $\Omega_0^2$ | | .494 / .483 | | | .494 / .483 | | | .494 / .483 | |

*Note*. Model 1 displays the random-coefficients regression analysis with the task demand variable entered as an independent variable at Level 2. Model 2 includes the intercept-as-outcome regression analysis with the trait as a predictor of the intercepts at Level 3. Model 3 includes the slope-as-outcome regression analysis with the trait as predictor of the slopes at Level 3. Level 1 model: $Y_{ijk} = \pi_{0jk} + e_{ijk}$. Level 2 model: $\pi_{0jk} = \beta_{00k} + \beta_{01k}$ x (task demand) + $r_{0jk}$. Level 3 model for random-coefficients regression analysis: $\beta_{00k} = \gamma_{000} + \mu_{00k}$ and $\beta_{01k} = \gamma_{010} + \mu_{01k}$. Level 3 model for intercept-as-outcome and slope-as-outcome analyses: $\beta_{00k} = \gamma_{000} + \gamma_{001}$ x (trait neuroticism) + $\mu_{00k}$ and $\beta_{01k} = \gamma_{010} + \gamma_{011}$ x (trait neuroticism) + $\mu_{01k}$. ,Parameter estimates are standardized.

Table 4: *Results for the Regression Analyses predicting Job Performance*

**A. Conscientiousness**

| Urgency | Step 1 | | Step 2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | b | t | b | t | b | t |
| *(Constant)* | *75.16* | *67.67* ** | *80.38* | *12.95* ** | *57.15* | *5.27* ** |
| SCC (U) | 0.00 | -0.04 | -0.02 | -0.21 | 0.11 | 1.07 |
| Trait C | | | -0.08 | -0.86 | -0.14 | -1.53 |
| Mean State C | | | | | 0.28 | 2.59 * |
| $R^2$ | 0.000 | | 0.006 | | 0.058 | |

| Difficulty | Step 1 | | Step 2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | b | t | b | t | b | t |
| *(Constant)* | *75.78* | *69.44* ** | *80.56* | *13.65* ** | *64.19* | *7.05* ** |
| SCC (D) | 0.20 | 2.27 * | 0.20 | 2.26 * | 0.19 | 2.18 * |
| Trait C | | | -0.07 | -0.82 | -0.14 | -1.55 |
| Mean State C | | | | | 0.22 | 2.33 * |
| $R^2$ | 0.040 * | | 0.046 | | 0.087 * | |

| Importance | Step 1 | | Step 2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | b | t | b | t | b | t |
| *(Constant)* | *79.73* | *22.66* ** | *84.99* | *12.24* ** | *68.21* | *6.73* ** |
| SCC (I) | -0.12 | -1.37 | -0.13 | -1.39 | -0.10 | -1.10 |
| Trait C | | | -0.08 | -0.88 | -0.15 | -1.57 |
| Mean State C | | | | | 0.21 | 2.24 * |
| $R^2$ | 0.015 | | 0.021 | | 0.061 | |

**B. Neuroticism**

| Urgency | Step 1 | | Step 2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | b | t | b | t | b | t |
| *(Constant)* | *83.02* | *25.90* ** | *80.21* | *22.75* ** | *81.84* | *19.80* ** |
| SCN (U) | -0.23 | -2.60 ** | -0.26 | -2.95 ** | -0.26 | -2.83 ** |
| Trait N | | | 0.16 | 1.83 | 0.18 | 1.96 |
| Mean State N | | | | | -0.07 | -0.76 |
| $R^2$ | 0.052 ** | | 0.078 ** | | 0.082 * | |

| Difficulty | Step 1 | | Step 2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | b | t | b | t | b | t |
| *(Constant)* | *83.53* | *23.95* ** | *80.81* | *20.85* ** | *80.45* | *20.09* ** |
| SCN (D) | -0.22 | -2.52 * | -0.24 | -2.72 ** | -0.26 | -2.48 * |
| Trait N | | | 0.14 | 1.57 | 0.13 | 1.44 |
| Mean State N | | | | | 0.04 | 0.38 |
| $R^2$ | 0.049 * | | 0.068 * | | 0.070 * | |

| Importance | Step 1 | | Step 2 | | Step 3 | |
|---|---|---|---|---|---|---|
| | b | t | b | t | b | t |
| *(Constant)* | *75.12* | *45.89* ** | *72.56* | *26.94* ** | *75.18* | *20.84* ** |
| SCN (I) | 0.00 | -0.02 | 0.00 | 0.05 | -0.18 | 0.86 |
| Trait N | | | 0.11 | 1.19 | 1.43 | 0.15 |
| Mean State N | | | | | -1.09 | 0.28 |
| $R^2$ | 0.000 | | 0.012 | | 0.021 | |

Figure 1: Frequency Distributions of the Six Situation Contingencies