

# Situational judgments tests, self-insight, and personality: A suppression situation

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## ABSTRACT

A self-insight measure and a situational judgment test (SJT) resulted in a suppression situation in predicting Big 5 personality dimensions. The suppression situation improved prediction from 24% for openness to experience to 98% for extraversion. Past research has likely and substantially underestimated the construct overlap between SJTs and personality.

Multiple regression results can be categorized as describing either redundancy situations or suppressor situations (Tzelgov & Henik, 1991). By far, most regression results are redundancy situations. Specifically, the standardized beta weights for predictor variables (i.e., the independent variables) are smaller than their zero-order correlations with the criterion (i.e., the dependent variable). This situation is described as a *redundancy situation* because, to some extent, the predictor variables are redundant in their prediction of the dependent variable.

More rarely, some regression results are suppression situations. Horst (1941) introduced the concept of a suppressor variable as a predictor that is correlated zero with the dependent variable but still enhances prediction by being correlated with other variables. The term *suppressor* was offered for this variable because it suppresses criterion-irrelevant variance in the other independent variables. When the standardized beta weights in a two-predictor regression are larger than the zero-order correlations, suppression is evident. This occurs because each predictor partials criterion-irrelevant variance in the other. Although researchers will often refer to suppressor variables, the more appropriate description is *suppression situation* (Tzelgov & Henik, 1991). This is because the same two predictors may yield a suppression situation in the prediction of one criterion but not with another criterion. Whether there is a

suppression situation or a redundancy situation depends on the interrelations among the variables. Specifically, some predictor variance is criterion-irrelevant for some criteria but not for other criteria. For example, in examining the correlates of state-level IQ, McDaniel (2006) found a suppression situation for predicting state-level criteria unrelated to race but not state-level criteria predicted by race.

Situational judgment tests (SJTs) require respondents to judge the effectiveness of responses to a work problem situation (Weekley & Ployhart, 2006; McDaniel, Hartman, Whetzel & Grubb, 2007). We suggest that these responses are dependent on self-insight. Knowledge concerning effectiveness of one's own behavior in various situations is dependent, in part, on the ability to learn from past experiences. Those high in self-insight are more aware of how their behavior has affected themselves and others. Thus, knowledge gained by those high in self-insight will be more accurate than knowledge gained by those with less self-insight. We suggest that some of the variance in SJTs is due to individual differences in self-insight.

SJTs are best considered as methods that assess multiple constructs (Schmitt & Chan, 2006; McDaniel & Whetzel, 2005; McDaniel et al., 2007). Correlations between SJTs and personality measures are often used to help identify the constructs assessed by a particular SJT (McDaniel et al., 2007). Personality is substantially genetic

(Bouchard & Loehlin, 2001; Jang, McCrae, Angleitner, Riemann, & Livesley, 1998) and the source of the remaining variance, due to the environment, is not well understood. Learning, facilitated by self-insight, may play little role in the development of personality. Thus, to the extent that personality is not a function of learning, self-insight may be correlated near zero with personality. Thus, we suggest that variance in a SJT that can be attributed to self-insight is not related to personality.

This reasoning suggests that using a self-insight measure and a SJT to predict personality will create a suppression situation. In a regression where the dependent variable (i.e., the criterion) is a measure of personality, and the predictors are self-insight and a SJT, the self-insight measure may partial out the criterion-irrelevant self-insight variance from the SJT resulting in increased prediction of personality for the SJT. Thus, we offer a hypothesis:

H: A self-insight measure in combination with a SJT will result in a suppression situation for the prediction of personality.

We evaluate the hypothesis using a large sample.

### Method

*Sample.* The sample consisted of 702 respondents. Some were college students who voluntarily participated for course credit. Others respondents were drawn from the community and participated for cash or gift cards. Respondents completed the survey package anonymously. This research plan was reviewed and approved by a human research committee.

*Personality measure.* We measured the Big 5 personality traits using two instruments. One instrument, the Mini-IPIP Scales (Donnellan, Oswald, Baird, & Lucas, 2006) assessed the Big 5 with Likert items. The second Big 5 measure was a forced-choice measure developed by Heggstad, Morrison, Reeve, & McCloy, R.A. (2006). These 10

scales served as dependent variables in the regressions evaluating the hypothesis.

*Situational judgment test (SJT).* The SJT used in this research is described in McDaniel, Psotka, and Legree, (2009). That paper describes multiple scale development methods. The measure used in this study is the 136-item standardized consensus scale.

*Self-insight measure.* Self-insight was operationalized as the difference between a cognitive ability test score and a self-report measure of cognitive ability. The cognitive ability test was designed to be a short measure (23 multiple choice items) of general cognitive ability. The self-report measure of cognitive ability consisted of nine items evaluated with a 5-point Likert scale of agreement. Sample items include: "I am more intelligent than most of my friends" and "Sometimes I have trouble thinking of the right words." Because the test and self-report measures of cognitive ability used different metrics (i.e., different numbers of items, multiple choice vs. Likert), both scales were transformed into  $z$  scores. The self-report measure was subtracted from the test measure to yield the self-insight measure. Low scores on the measure suggest that respondents overestimated their true cognitive ability (as measured by the cognitive ability test) when completing the self-report measure. In other words, low scoring respondents indicated that they were more cognitively gifted than indicated on the cognitive ability test.

Because the self-insight measure is a difference between  $z$  scores, some scores are positive and some are negative. The zero point on the self-insight measure is not readily interpretable. If a respondent is at the mean on the cognitive ability test (a score of zero) and is at the mean of the self-report cognitive ability measure (a score of zero), the respondent would have a zero on the self-insight variable (zero minus zero). However, on average, people tend to overestimate their cognitive ability (as well as other abilities and skills) (Dunning, Hohnson, Ehrlinger & Kruger, 2003;

## Results

Kruger & Dunning, 1999; Schaefer, Williams, Goodie & Campbell, 2004). Thus, scoring at the mean of the self-report measure most likely means that one is overestimating one's cognitive ability. This would cause a self-insight score of zero to indicate that people are overestimating their cognitive ability in their self-report. Somewhere in the positive range of the self-insight measure is the score where self-reported cognitive ability is identical to objectively assessed cognitive ability. Scores above that point indicate a respondent's self report is underestimating the respondent's objectively assessed cognitive ability. Because one does not know the self-insight score that separates the overestimators from the underestimators, one cannot identify which respondents overestimate their cognitive ability and which underestimate their cognitive ability. This prevents one from transforming the self-insight variable into an absolute value where a score of zero indicating perfect agreement (perfect self-insight) between objectively assessed and self-reported cognitive ability, and scores above or below zero would indicate some difference (either overestimate or underestimate) from perfect self-insight. Thus, one is left with a self-insight measure where lower scores can be interpreted as overestimation of cognitive ability and higher scores indicate improved self-insight up to the (unknown) tipping point in the positive score range. Scores higher than this tipping point would indicate underestimation of cognitive ability.

*Analyses.* Ten regression analyses were conducted, once for each the 10 personality scales (the five Likert personality scales and the five forced-choice personality scales). In each regression, the personality scale was the dependent variable and the two predictors were the self-insight measure and the SJT. A suppression situation would be evident if the standardized beta weight for a predictor was larger than the zero-order correlation for the predictor.<sup>1</sup>

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<sup>1</sup> Note that the zero-order correlation for the predictor is identical to the standardized beta weight if the variable was the sole predictor.

Table 1 shows the correlations among the self-insight variable, the SJT, and the 10 personality variables. Table 2 shows the results for the 10 regressions. In these regressions, the personality variable served as the dependent variable and self-insight and the SJT were the predictors. Column 1 shows the name of the dependent variable. Column 2 shows the standardized beta weight for self-insight as the sole predictor. The standardized beta weight is the same as the correlation between self-insight and the personality scale. Thus, for the forced-choice conscientiousness scale, the standardized beta weight was -.099. Column 3 shows the standardized beta weight for self-insight when the SJT was added to the regression equation as an additional predictor. Note in column 3 that the beta weight rose from -.099 when self-insight was the sole predictor to -.150 when the SJT was added. The difference in the magnitude of the beta weights was .051 which is recorded in column 4. Given that this difference is positive, the regression is characterized as a suppression situation. Column 5 presents the standardized beta weight for SJT when it is the sole predictor and column 6 shows the beta weight for the SJT when self-insight is also a predictor. For the forced-choice conscientiousness measure, the standardized beta weight for the SJT as the sole predictor was .129. When the self-insight variable was added as a predictor, the standardized beta weight for the SJT rose to .173. This increase of .045 is shown in column 7. Because the change in the standardized beta weight is positive, the regression results demonstrate a suppression situation. Because the standardized beta weights for both predictors increased in the presence of the other predictor, the regression situation is best classified as a reciprocal suppression situation (Tzelgov & Henik, 1991). Column 8 shows the multiple *R* for the two-predictor regression equation. The difference between this multiple *R* and the correlation in column 5 (the correlation between the SJT and the personality variable) is the incremental validity

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gained by the suppression situation. For the forced-choice conscientiousness scale, the SJT alone yielded a correlation of .129 (column 5). When the self-insight variable was added to the equation, the multiple  $R$  for the two predictor equation was .193 (column 8). Thus, the suppression situation incremented the prediction of the forced-choice conscientiousness scale by .064. This incremental correlation is shown in column 9. Expressed another way, the suppression situation increased the correlation between the SJT and the forced-choice conscientiousness scale by 33%<sup>2</sup>. This percentage improvement is shown in column 10.

A review of Table 2 shows that a suppression situation existed in all regression results except for agreeableness. For the Likert agreeableness scale, the regression is a redundancy situation in that the standardized beta weights for each predictor dropped when the other was added. For the forced-choice agreeableness scale, the regression results fit the definition of a suppressor (e.g., standardized beta weight increased) but the increase in prediction was trivial (i.e., an incremental  $R$  of .006).

In contrast to the results for agreeableness, and in strong support of the hypothesis, a clear suppression situation emerged for the prediction of each of the remaining Big 5 scales. The increase in the  $R$  increment ranged from .050 for the Likert conscientiousness scale to .236 for the Likert extraversion scale. Expressed as a percentage increase in  $R$ , the increases ranged from 24% for the forced-choice openness to experience scale to 98% for the Likert extraversion scale. For that scale, the SJT was correlated only -.004 with the Likert extraversion scale, but when the suppressor situation was considered, the  $R$  increased to .236.

## Discussion

Suppression situations have been described as “one of the most elusive and difficult-to-grasp dynamics in the interpretation of statistical data” (Lancaster, 1999, p. 2). However, as indicated in

this paper, suppression situations, when found, can result in substantial increases in prediction (24% to 98% in these data). Concerning the advancement of knowledge concerning SJTs, these results suggest that past correlations between SJTs and personality measures may be substantially underestimated (McDaniel et al., 2007).

The exception to the trend in our data was for the prediction of agreeableness where no meaningful suppression effects were found. We note that agreeableness was the largest magnitude correlate of the SJT (Table 2, column 5) and this magnitude may have some involvement in the lack of suppression results.

The largest suppression effects were found for extraversion. For the forced-choice extraversion measure, the beta weight for the SJT increased from .077 as the sole predictor to .274 in the two-variable suppression model. This was a 72% increase in the magnitude of the correlation. For the Likert extraversion scale, the correlation increased from a zero-order correlation of .021 to .248 in the two variable suppression model. This was a 98% increase in the correlation.

### *Limitations and suggestions for future research*

Although the suppression situations observed in this study are very large and although the findings have important implications for understanding the correlates of SJTs, this research is not without limitations. We offer several limitations and suggestions for future research.

First, it was asserted that the difference score between objectively-measured cognitive ability and self-reported cognitive ability is best characterized as a measure of self-insight. Self-insight can be measured in many ways (Kwan, John, Kenny, Bond & Robbins, 2004; Moore & Healy, 2008) and these results should be replicated with other measures of self-insight. A key consideration for future research should be the development of a measure where the value for perfect self-insight can be identified such

<sup>2</sup>  $33 = ((.193 - .129)/.129) * 100$

that one can distinguish between over- and under-estimation in the measurement of self-insight.

Second, our theoretical model holds that self-insight should contribute to a suppression situation only when the criterion is not influenced by learning. Job performance has a clear and strong relationship with job experience that enhances learning (McDaniel, Schmidt & Hunter, 1988) and thus one should not expect self-insight to contribute to a suppression situation in predicting job performance. Thus, we argue that the results are unlikely to generalize to job performance. Therefore, our suppression situation results may have the most import for assessing the construct validity of a SJT and little to no import for the prediction of job performance. This conjecture should be evaluated in future research.

Third, future research should evaluate the credibility of the theoretical model. Specifically, we argued that individual differences in personality are not a function of learning and therefore self-insight should be largely unrelated to personality. Although this study's measure of self-insight has low zero-order correlations with personality in general (Table 2, column 2), the correlations for the extraversion scales were both negative moderate

values (-.228 and -.230; extroverts overestimate their intelligence more than introverts; also see Schafer et al., 2004). Thus, although our suppression results are of large magnitude, the theory we offered to explain the results may be incorrect at least some of the time.

Fourth, Tzelgov and Henik (1991) noted that standardized beta weights indicating suppression have very high errors of estimate. For this reason, any offered suppression situations should be carefully replicated. Although in our data, we had two scales for each personality construct, which is a replication in itself, replication in other samples is clearly warranted.

### *Conclusion*

This paper presented a theoretical model suggesting that self-insight and SJTs may create a suppression situation when predicting criteria that are not influenced by knowledge gained through experience. We demonstrated the hypothesized suppression situation in eight of ten personality scales. Our results showed that ignoring the suppression situation results in substantial underestimates of correlations between the SJT and four of the Big 5.

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Table 1. Correlation matrix for study variables

	1	2	3	4	5	6	7	8	9	10	11
1. Self-insight											
2. SJT	0.296										
3. Conscientiousness – Forced-Choice	-0.099	0.129									
4. Conscientiousness – Likert	-0.081	0.131	0.544								
5. Agreeableness – Forced-Choice	0.041	0.344	0.175	0.147							
6. Agreeableness – Likert	0.158	0.317	0.091	0.202	0.433						
7. Emotional Stability – Forced-Choice	-0.124	0.102	0.385	0.214	0.362	0.035					
8. Emotional Stability – Likert	-0.058	0.089	0.182	0.126	0.235	0.016	0.575				
9. Extraversion – Forced-Choice	-0.228	0.077	0.274	0.135	0.324	0.181	0.199	0.105			
10. Extraversion – Likert	-0.230	-0.004	0.077	0.047	0.172	0.157	0.082	0.147	0.598		
11. Openness to Experience – Forced-Choice	-0.097	0.189	0.286	0.178	0.255	0.165	0.249	0.152	0.280	0.101	
12. Openness to Experience – Likert	-0.113	0.159	0.073	0.113	0.136	0.213	0.153	0.136	0.172	0.148	0.486

Table 2 Self-insight and situational judgment in the prediction of personality

	Beta for self-insight as sole predictor	Beta for self-insight when SJT is added as a predictor	$\Delta$ Beta for self-insight	Beta for SJT as sole predictor	Beta for SJT when self-insight is added as a predictor	$\Delta$ Beta for SJT	Two predictor <i>R</i>	<i>R</i> increment over SJT alone	Percent increase in <i>R</i>
Conscientiousness – Forced-Choice	-0.099	-0.150	0.051	0.129	0.173	0.045	0.193	0.064	33
Conscientiousness – Likert	-0.081	-0.131	0.050	0.131	0.170	0.039	0.181	0.050	28
Agreeableness – Forced-Choice	0.041	-0.066	0.025	0.344	0.364	0.020	0.350	0.006	2
Agreeableness – Likert	0.158	0.070	-0.088	0.317	0.297	-0.021	0.324	0.007	2
Emotional Stability – Forced-Choice	-0.124	-0.170	0.045	0.102	0.153	0.050	0.192	0.089	47
Emotional Stability – Likert	-0.058	-0.092	0.034	0.089	0.116	0.027	0.125	0.036	29
Extraversion – Forced-Choice	-0.228	-0.275	0.047	0.077	0.159	0.081	0.274	0.196	72
Extraversion – Likert	-0.230	-0.251	0.021	-0.004	0.070	0.067	0.240	0.243	98
Openness to Experience – Forced-Choice	-0.097	-0.167	0.071	0.189	0.239	0.050	0.248	0.058	24
Openness to Experience – Likert	-0.113	-0.176	0.062	0.159	0.211	0.052	0.231	0.072	31