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SELECTION MEASURES FOR A TEAM ENVIRONMENT: THE RELATIONSHIPS AMONG THE WONDERLIC PERSONNEL TEST, THE NEO-FFI, AND THE TEAMWORK KSA TEST

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Running Head: SELECTION MEASURES FOR A TEAM ENVIRONMENT

Selection Measures for a Team Environment: The Relationships Among The Wonderlic Personnel Test, The NEO-FFI, and the Teamwork KSA Test[1]

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Abstract

Stevens and Campion (1994) developed the "Teamwork KSA test" to predict job performance in a team environment. The Teamwork KSA test scores correlate highly with measures of cognitive ability. Stevens and Campion contend that this test is a behavioural measure and does not measure personality. However, results of this study indicate that the Teamwork KSA test may be a function of both cognitive ability and personality as measured by the Big Five. The results have implications for the potential usefulness of the Teamwork KSA test relative to an ability/personality test combination for the purpose of selection.

Selection Measures for a Team Environment: The Relationships Among Ability, the Big Five Personality Factors and the Teamwork KSA Test

The use of product development teams by organizations has substantially increased in the past decade as organizations recognize the potential of these teams to reduce product development time and increase the potential success of the product (Cooper, 1994; Cooper & Kleinschmidt, 1994; Cooper & Kleinschmidt, 1993; Larson & Gobeli, 1988; Perry, 1990). Of course, the implementation of product development teams does not guarantee project timeliness or even product success. The potential of the team is maximized to the degree that the team is composed of the "right" people (Kezsbom, 1992; Lane, 1987; Rideout, 1986). It is therefore of interest to identify selection tests that allow us to assemble successful teams a timely and cost effective manner.

Selecting the optimal members for a team is a relatively new undertaking. There are few established procedures or tests that have been validated for this purpose. The objective of this study is to examine a newly developed team selection test called the "Teamwork KSA test" (Stevens & Campion, 1994) and to compare this test to already established methods used to select individuals.

Individual Selection Measures

Cognitive (mental) ability tests are one of the oldest tools used to select personnel (Gatewood & Feild, 1994). These tests are designed to measure the "overall" ability of a person

to function in a variety of situations. Empirical evidence suggests that mental ability tests are valid predictors for a wide variety of jobs (Campbell, 1990; Gatewood & Field, 1994; Schmidt, Hunter, & Pearlman, 1981) with validities of up to .65 (Campbell, 1990; McHenry, Hough, Toquam, Hanson, & Ashworth, 1990; Lubinski & Dawis, 1991) in predicting job task performance.

People high in cognitive ability are faster at cognitive operations on the job, are better able to prioritize between conflicting rules, are better able to adapt old procedures to altered situations, and are better able to learn new procedures quickly as the job changes over time (Hunter, 1986). Thus, general ability tests have been found to be especially useful in predicting the probability of success in jobs that have information processing and problem-solving components (Schmidt, Hunter, & Pearlman, 1981). Other ability-related factors (such as experience) have not been shown to add meaningful predictive validity for job performance to that provided by general cognitive tests (Ree, Earles, & Teachout, 1994).

In addition to ability tests, personality testing of potential employees has also become popular. Current results from the personnel selection literature indicate that if relevant personality traits are identified for a specific job or role, future performance can be predicted (Barrick & Mount, 1991; Borman, Rosse, & Abrahams, 1980; Day & Silverman, 1989; Hough, 1992; Lord, DeVader, & Alliger, 1986; Tett, Jackson, & Rothstein, 1991).

The "Big Five" (Conscientiousness, Extraversion, Neuroticism, Agreeableness, and Openness to Experience) personality factors have received a great amount of support as a personality classification system and have become widely used in the personnel selection literature

(Barrick & Mount, 1991; Digman, 1990; Tupes & Christal, 1961; Norman, 1963; Goldberg, 1990; McCrae & Costa, 1987; Digman & Inouye, 1986).

The factor of Conscientiousness has been shown to have positive validity in predicting future job performance for all occupational groupings (Barrick & Mount, 1991; Tett, Jackson, Rothstein & Reddon, 1994). Extraversion has been shown to have positive validity in predicting future job performance for those occupations with a large social component (Barrick & Mount, 1991). Neuroticism, although not directly related to job performance, may have a "threshold" level below which normal job functioning is not possible (Barrick & Mount, 1991). Openness to Experience has been shown to be indicative of a person's training proficiency (Barrick & Mount,1991).

In addition to providing predictive validity between job-relevant personality factors and job performance, personality has been shown to provide incremental in predicting job performance over that provided by ability (Day & Silverman, 1989). Therefore, ability and personality tests used in conjunction seem to be a powerful tool in predicting the success of future employees.

The Teamwork KSA test

Stevens & Campion (1994a) extensively reviewed the team literature, including the sociotechnical literature, the organizational behavior literature, the industrial engineering literature, and the social psychology literature in order to produce an overall taxonomy of KSA's required for effective teamwork. Stemming from this work, these authors also developed an instrument to measure the knowledge, skills and abilities (KSA's) necessary to successfully work in a team environment (Stevens & Campion, 1994b). The Teamwork KSA test (Stevens &

Campion, 1994b) was designed with an emphasis on "attributes which management can influence" such as learnable behaviours or abilities. The questions on the KSA test require the person taking the test to choose among various behaviours or courses of action in response to a specific situation or problem that may occur during team functioning. Thus, in effect, subjects are tested on their knowledge of behaviours that are thought to contribute to effective team functioning.

Since the test measures knowledge, and most ability tests measure some form of knowledge (Gatewood & Feild, 1994), one would expect that the scores on the Teamwork KSA test would be positively related to scores on a general cognitive ability test. In fact, the authors found a correlation between the KSA Teamwork ability test and a battery of nine general aptitude tests to be .81 ($p<.05$). It is therefore expected that the Teamwork KSA test will be positively and significantly related to a measure of cognitive ability such as the Wonderlic Personnel test.

The authors focused on behaviours conducive to teamwork rather than personality measurement in the development of the Teamwork KSA test. However, the authors' focus on behaviour implicitly involves personality because behaviour is usually a manifestation of a person's disposition or personality. Assuming that the way in which a person answers the questions on the KSA test is indicative of the way in which the person will actually behave, it is possible that the score on the KSA test indirectly measures personality. That is, a person may not know what constitutes effective behaviour in a team environment, however, his or her natural response (based on his or her personality) to the situations presented in the test are effective behaviours. Thus, the KSA Teamwork test could conceivably be a measure of how well a certain person matches the "perfect teamwork personality" type. Since no one has developed the

"perfect teamwork personality" profile yet, this hypothesis cannot be tested. However, it is expected that there will be a relationship between the Teamwork KSA test and personality. Thus, the relationship between the Teamwork KSA scores and the Big Five personality factors will be examined.

Method

Subjects

The subjects were 385 first year undergraduate Engineering Students enrolled in a problem-solving course. Twenty percent of the subjects were female. The subjects ranged in age from 16 to 32 years of age with the median age being 19 years.

Measurements

General ability was measured using Form IV of the Wonderlic Personnel Test. This short (12 minute), test of general cognitive ability includes items in vocabulary, "commonsense" reasoning, formal syllogisms, arithmetic reasoning and computation, analogies, perceptual skill, spatial relations, numerical series, scrambled sentences and knowledge of proverbs. The primary factors measured are verbal comprehension, deduction, and numerical fluency (Foley, 1972; Gatewood & Feild, 1994; Wonderlic Personnel Test Booklet, 1992). The advantage of using the Wonderlic Personnel test is that it is short and has been normed on various populations over a long period of time (since 1938) and has been extensively tested in terms of validity and reliability.

Team member personality was measured using the NEO-FFI (which is a shortened version of the NEO-PI) personality test (Costa & McCrae, 1992) consisting of 60 5-point scale items (ranging from (1) strongly disagree to (5) strongly agree). The NEO-PI test has been

recommended by Hogan (1991) as a good measure of the Big Five personality dimensions. In a review of this test for the Eleventh Annual Measurements Yearbook, Widiger concluded that "any study that purports to be addressing fundamental dimensions of personality should include the NEO-PI as a measure" (pg 606). The NEO-PI has reported alpha coefficients across the facets measured ranging from .61 to .79 for men and .60 to .82 for women (Hess, 1992). Both Hess (1992) and Widiger (1992) refer to the NEO-PI as having "impressive" validity. The NEO-FFI was developed by taking the 12 items with the highest absolute factor loadings on each of the five factors (Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness) from the NEO-PI (McCrae & Costa, 1992; Schmit & Ryan, 1993). Correlations between the NEO-FFI scales and the NEO-PI factors range .75 to .89 (Costa & McCrae, 1992; Schmit & Ryan, 1993). Alpha coefficients in this sample for each of the 12 item scales were found to be .85 (N), .78(E), .75(E), .76 (A), and .83 (C) which was in accordance with previous reports (.89, .79, .76, .74, and .84 respectively; Costa & McCrae, 1989; Schmit & Ryan, 1993).

As previously stated, the relationships among two commercially available selection tests (e.g. the Wonderlic and the NEO-FFI) and the Teamwork KSA test developed by Stevens & Campion (1994) were examined in this study. In developing this test, the authors extensively reviewed the team literature, including the sociotechnical literature, the organizational behavior literature, the industrial engineering literature, and the social psychology literature in order to produce an overall taxonomy of KSA's required for effective teamwork. The two major categories of KSA's include those addressing interpersonal KSA's and Self-management KSA's

demonstrating both a concern with the individual and team level of analysis. Within the interpersonal KSA's, three subcategories emerged: conflict resolution KSA's, collaborative problem solving KSA's, and communication KSA's. The subcategories of self-management KSA's include: goal setting and performance measurement KSAs as well as planning and task coordination KSAs.

Procedure

Subjects were given the Wonderlic Personnel Test, the NEO-FFI personality test, and the Teamwork KSA test during one two-hour class. In accordance with instructions, the subjects were given only 12 minutes to complete as many questions as they could on the Wonderlic Personnel Test. There was no time limit for the remaining two tests. The Teamwork KSA test took approximately the same amount of time to complete as did the Wonderlic Personnel test and NEO-FFI test together.

Participation in the study was voluntary. The only "reward" for participation was feedback with respect to their scores on the tests.

Results and Discussion

Table 1 provides the means and standard deviations for each of the variables. Males and females were found to significantly differ in their means for each of the variables under consideration with the exception of Extraversion. Given that gender accounts for some of the variance in most of the variables, and the sample used in this study is comprised of a disproportionate percentage of males (80%), gender was used as a covariate in most of the analyses so that the relationships found in this study could be generalized to the population.

The significant correlations between the five factors of personality and the scores on the Wonderlic Personnel test scores are somewhat of a surprise given previous claims that the "Big Five" personality factors are "relatively independent" of measures of cognitive ability (Barrick & Mount, 1991). A posthoc stepwise regression analysis was done in an attempt to understand the underlying dynamics of these results. The Wonderlic personnel score was entered as the dependent variable and the five personality factors were entered as the independent variables. Gender was used as a covariate. The resulting regression equation showed that gender accounted for approximately 2% ($p<.001$) of the variance in the Wonderlic scores. Both Neuroticism ($\Delta R^2 = .11$, $p<.001$) and Openness to Experience ($\Delta R^2 = .04$, $p<.001$) were also found to account for a significant amount of variance once the effect of gender had been partialled out. It appears, therefore, that the remaining factors (Conscientiousness, Extraversion, and Agreeableness) showed significant partial correlations with the Wonderlic score by virtue of their high intercorrelation with the Openness to Experience and Neuroticism factors (Table 1).

Although previous authors have claimed that there is a very limited relationship between ability and the Big Five personality factors, the significant relationships found in this study between ability and the factors of Neuroticism and Openness to Experience are theoretically compatible with the definitions of these two factors. Neurotic tendencies such as anxiety, depression, or poor coping mechanisms (McCrae & Costa, 1987) may interfere with a person's ability to mentally function at an acceptable level (Barrick & Mount, 1991). It would therefore not be surprising that this deficiency in emotional stability would be captured by a general

cognitive ability test. Alternatively, the factor of Neuroticism, as measured by the NEO-FFI could be measuring aspects of cognitive ability.

Previous researchers have found correlations of .30 between the factor of Openness to Experience and psychometric measures of intelligence (McCrae & Costa, 1987). Thus, the significant correlation between the Wonderlic Personnel test and the factor of Openness to Experience found in this study is consistent with previous results ($r = .29$, $p<.001$). McCrae & Costa (1987) interpret this relationship to mean that either Openness may help to develop intelligence, or, that an intelligent person may be more open to experience. However, they also contend that Openness to Experience and Intellect should be construed as two separate dimensions of individual differences.

The primary factors evaluated by the Wonderlic Personnel test are verbal comprehension, deduction, and numerical fluency. Traditionally, females have been shown to excel in the verbal domains while males have excelled in mathematics and spatial visualization (Lubinski & Dawis, 1991 ; Maccoby & Jacklin, 1974; Tyler, 1965). Given the fairly equal representation of these two domains on the Wonderlic test, a gender difference among scores would not be expected, and, indeed has not been found to exist in populations having attained 13 years[2] of education (Wonderlic Test Manual, 1992). The significant difference found between the male and female Wonderlic Personnel Test scores ($M_{Male} = 22.0$ versus $M_{Female} = 24.0$, $p<.01$) in this sample was contrary to expectations and may be unique to Engineering students. All of the students who

[2] In Ontario, students must accomplish Grade 12 plus their OAC's in order to attend university. Thus, most students have 13 years of education coming into university. Note that the OAC's are not necessarily equivalent to a grade 12 from other provinces or the States. Many students coming from out of province must take preparatory courses after high school in order to be able to do the first year of Engineering Science. Thus, 13 years of education was chosen as the most relevant comparison point in the Wonderlic Personnel test User's Manual.

enter Engineering have substantial and successful backgrounds in mathematics. It would therefore be expected that Engineering students would, as a whole, perform better in numerical fluency and deduction than most of the population regardless of gender (e.g. perhaps the inequality of mathematical proficiency in the population between males and females is reflected in the imbalance of males (80%) and females (20%) in the Engineering program rather than in the scores for this sample). Thus, if the females in this sample are strong in mathematical proficiency and yet still retain their traditional advantage in verbal ability, this may explain the significantly higher scores found on the Wonderlic Personnel test for females.

The moderately high correlation between the Wonderlic Personnel test scores and the KSA teamwork scores ($r = .64$, $p<.001$) is consistent with the relationship between a job-related aptitude composite (consisting of nine standardized aptitude tests) and the KSA test scores demonstrated by the developers of the KSA test ($r = .81$, $p<.05$). This significant relationship also implies that the Teamwork KSA test and the Wonderlic Personnel test would have some characteristics in common. Similar to the Wonderlic Personnel test, females were found to score significantly higher on the Teamwork KSA test than males ($M_{female} = 24.0$ versus $M_{male} = 21.6$, $p<.01$). The difference between the male and female Teamwork KSA scores remains significant even when the gender differences accounted for by the Wonderlic are controlled ($p<.05$).

Correlations between the five personality factors and scores on the Teamwork KSA test are significant at the $p<.001$ level (Table 1). Given the moderately high correlation between the Wonderlic Personnel test and the KSA Teamwork test ($r = .64$, $p<.01$), and the significant relationships between the personality factors and the Wonderlic Personnel test discussed above, it

stands to reason that some of the relationship (if not all) between the personality factors and the Teamwork KSA test would disappear if the variance in Teamwork KSA scores shared with the Wonderlic scores was controlled. In fact, this is the central question in establishing whether the Teamwork KSA test is indeed measuring personality in addition to ability. The partial correlations controlling for the Wonderlic score showed that all five of the personality factors are still significantly correlated with the Teamwork KSA scores at the $p<.001$ level (Table 2). These relationships are also significant at the $p<.001$ level when the effect of gender is partialled out. In order to determine the degree to which ability and personality independently contribute to the variance of the Teamwork KSA scores, two hierarchical regression analyses were done with the KSA test scores as the dependent variable. In the first regression analysis, after partialling out the effect of gender, the Wonderlic test score was entered in the first step followed by the five personality variables in the second step. Gender ($\Delta R^2 = .03$, $p<.001$), the Wonderlic test scores ($\Delta R^2 = .38$, $p<.001$) and the five personality variables ($\Delta R^2 = .11$, $p<.001$) account for a significant amount of variance in the KSA scores. The second hierarchical regression involved entering the five personality factors on the first step and the Wonderlic test scores on the second. After partialling out the effect of gender, the personality variables together account for a significant amount of variance ($\Delta R^2 = .29$, $p<.001$) as do the Wonderlic Personnel test scores ($\Delta R^2 = .20$, $p<.001$). Thus, the personality test scores add incremental validity in explaining the Teamwork KSA scores over that of ability and the ability scores add incremental validity in explaining the Teamwork KSA scores over that provided by the personality factors. Considering the magnitude of the variance accounted for by the ability test in comparison with the personality

test, as expected, ability appears to make a larger contribution to the explanation of the Teamwork KSA scores than does personality. However, given the significant increase in variance explained by the personality factors over that explained by ability alone, the Teamwork KSA test seems to be measuring personality in addition to ability.

The partial correlations found between the personality factors and the Teamwork KSA test (after controlling for the Wonderlic test scores and the effect of gender) are all significant. However, it is possible that some of the personality factors might not account for significant increments in the variance of Teamwork KSA test scores because the five personality factors are moderately intercorrelated. A stepwise regression defining the Teamwork KSA test score as the dependent variable and the five personality factors and the Wonderlic test score as the independent variables, and partialling out the effect of gender, was done to investigate the pattern of partial correlations. As in the hierarchical analysis, the stepwise analysis indicated that gender ($\Delta R^2 = .03$, $p<.001$), and the Wonderlic Personnel test ($\Delta R^2 = .38$, $p<.001$) account for a significant amount of the variance in the Teamwork KSA test scores. The 11% incremental variance in Teamwork KSA scores found in the previous hierarchical analysis is accounted for by the factors of Agreeableness ($\Delta R^2 = .07$, $p<.001$), Openness to Experience ($\Delta R^2 = .02$, $p<.001$), and Neuroticism ($\Delta R^2 = .01$, $p<.001$). Together, the Wonderlic score, the three personality factors, and gender account for over half of the variance in the Teamwork KSA scores ($R^2 = .52$, $p<.001$; Adjusted $R^2 = .51$, $p<.001$). The factors of Extraversion and Conscientiousness do not add significantly to the variance in the Teamwork KSA scores accounted for by the other variables and are not included in the regression equation.

Although the KSA test purports not to measure personality traits nor a person's disposition, the fact that three of the Big Five personality factors account for almost 11% of the variance in the Teamwork KSA test scores over that accounted for by cognitive ability suggests that the test may be a measure of underlying personality factors conducive to teamwork as well as cognitive ability. Thus, the ultimate question in evaluating the potential usefulness of the Teamwork KSA test is whether this test provides greater utility in predicting future job performance than an ability and personality test together. In order for the Teamwork KSA test to outperform an ability/personality combination, the Teamwork KSA test must provide higher validity in predicting job performance provided by an ability/personality combination that may be administered in approximately the same amount of time (e.g. the Wonderlic Personnel test and the NEO-FFI), or, provide the same validity as the ability and personality test combination at a lesser cost.

Contrary to the argument put forth by Stevens & Campion (1994), it is possible that a personality test in conjunction with an ability test may be a better use of organizational resources than the administration of the Teamwork KSA test. There are several possible reasons for this.

Preliminary tests done by Stevens & Campion (1994b) indicate that individual scores on the teamwork KSA test significantly correlate with supervisor ratings of technical performance (Study 1: $r = .56$; Study 2: $r = .25$), teamwork performance (Study 1: $r = .44$; Study 2: $r = .21$), and overall performance (Study 1: $r = .52$; Study 2: $r = .23$), and provide incremental validity over ability in predicting teamwork ($\Delta R^2 = .03$, $p<.05$) and overall ($\Delta R^2 = .03$, $p<.05$) performance. However, as mentioned previously, the KSA test shares significant variance with the factors of

Agreeableness, Openness to Experience, and Neuroticism. These three factors, in turn share a significant amount of variance with Extraversion and Conscientiousness (Table 3). Conscientiousness and Extraversion have both received support as having significant validity in predicting job performance (Barrick & Mount, 1991). It is therefore possible that the relatively small amount of incremental validity in predicting job performance in a team environment attributed to the Teamwork KSA test over that of ability is actually a function of the variance the KSA test indirectly shares with the personality factors of Conscientiousness ($\Delta R^2 = .04$, $p<.001$) or Extraversion ($\Delta R^2 = .09$, $p<.001$) individually, or with the two factors together ($\Delta R^2 = .10$, $p<.001$). If the Teamwork KSA test's incremental validity in predicting job performance is a function of the established factors of Conscientiousness and Extraversion, a personality test may be a more efficient measure of these factors than the Teamwork KSA test.

In the case that the Teamwork KSA test does not derive its incremental validity from its relationship with the factors of Conscientiousness and/or Extraversion, the Teamwork KSA test may still have a problem outperforming an ability/personality combination. If the personality factors of Agreeableness, Openness to Experience, and Neuroticism (which account for 11% of the variance in the Teamwork KSA scores over that accounted for by ability) contribute to the Teamwork KSA test's incremental validity in predicting job performance in a team environment, these three factors should also provide similar incremental validity when measured by a personality test. The personality test also measures Conscientiousness and Extraversion which have established validity in predicting job performance. Thus, the factors which account for the remaining variance in the Teamwork KSA test score (i.e., variance not accounted for by

personality or ability, $\Delta R^2 = .48$) would have to be more strongly related to job performance than the established factors of Conscientiousness and Extraversion in order for the Teamwork KSA test to outperform an ability/personality test combination.

There is another front on which the Teamwork KSA test may be rivaled by a test of personality. A person may know what constitutes effective team behaviour (as measured by the KSA test), however, whether the person will actual behave in such a manner is another story. It may be that personality is a much better indicator of how a person is likely to act than is a test which measures one's knowledge of effective behaviour. One may argue that behaviours may be changed. However, if a person does not have the propensity to behave in a certain manner, repetitive training may be necessary to change his or her behaviours. Since training is an expensive proposition, it might be advantageous to hire people with the propensity to act in a manner conducive to the organizational environment. The Teamwork KSA's may be of value in helping to define the personalities associated with effective performance in a team environment rather than as a direct selection device.

The above speculation of why measuring personality and ability may be a better use of resources than administering the Teamwork KSA test simply provides potential arguments on the "other side of the coin" to those put forth by Stevens & Campion (1994). The usefulness of the Teamwork KSA test compared to that of an ability/personality test combination can only be settled by direct comparison of their predictive validities. In comparing two alternative selection strategies, the true measure of superiority should be how the strategy improves the organization's "bottom-line". Therefore, in future research comparing these selection measurements, the

performance criteria used should include measures that are directly linked to organizational success. That is, if subjective ratings of "teamwork performance" (either by the supervisor or peers) are used as the criteria (as they are in the Stevens & Campion 1994b validation study) for which each selection strategy is compared, it should be made clear how these ratings affect organizational performance.

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Table 1

Raw Correlations Among Scale Scores and Scale Means

	1	2	3	4	5	6	Mean (Fem.)	Mean (Male)	N: M/F
Wonderlic							24.0 (5.9)	22.0 (6.0)	304/75
KSA	.64**						24.0 (5.0)	21.6 (5.5)	305/75
Conscientiousness	.12*	.23**					36.4 (5.8)	33.0 (6.6)	305/75
Extraversion	.23**	.30**	.36**				31.5 (6.5)	31.2 (6.0)	305/75
Neuroticism	-.30**	-.39**	-.35**	-.45**			21.3 (8.6)	18.1 (7.9)	305/75
Agreeableness	.25**	.42**	.35**	.49**	-.49**		34.1 (6.6)	31.9 (6.0)	305/75
Openness to Experience	.29**	.38**	.19**	.35**	-.45**	.23**	3.8 (6.4)	28.4 (6.6)	305/75

*p<.05 **p<.001

Note. For "mean" columns, standard deviation is given in brackets; M=male, F=female; All differences in means are significant at the $p<.01$ level with the exception of Extraversion which was not significant

Table 2

Partial Correlations Among Scale Scores

	KSA - (Wonderlic controlled)	KSA (Wonderlic & gender controlled)	Wonderlic (KSA controlled)	Wonderlic (KSA & gender controlled)
Conscientiousness	.20***	.18***	-.02	-.04
Extraversion	.20***	.20***	.06	.06
Neuroticism	-.27***	-.30***	-.07	-.08
Agreeableness	.36***	.35***	-.02	-.03
Openness to Experience	.26***	.25***	.07	.07

*p<.05 **p<.01 ***p<.001

Table 3

Regression Analyses for Wonderlic and KSA Scores

	R^2 Cumulative[e]	ΔR^2	b[f]
Dependent Variable: Wonderlic			
Significant Independent Variables[a] :			
Neuroticism	.12	.10***	-.26***
Openness to Experience	.16	.06***	.20***
Dependent Variable: KSA			
Independent Variables[b]:			
Wonderlic (Step 2)	.41	.38***	.49***
All Personality Factors (Step 3)	.52	.11***	
Conscientiousness			.00
Extraversion			-.04
Neuroticism			-.15**
Agreeableness			.21***
Openness to Experience			.15***
Dependent Variable: KSA			
Independent Variables:			
All Personality Factors (Step 2)	.32	.29***	
Conscientiousness			.00
Extraversion			-.04
Neuroticism			-.15**
Agreeableness			.21***
Openness to Experience			.15***
Wonderlic (Step 3)	.52	.20***	.49***
Dependent Variable: KSA			
Significant Independent Variables[d]:			
Wonderlic	.41	.38***	12.56***
Agreeableness	.48	.07***	5.10***
Openness to Experience	.51	.01***	3.51***
Neuroticism	.52	.01**	- 3.27**

Table 3 (Continued)

*** p<.001 ** p<.01 * p<.05

[a] Stepwise regression: Independent variables entered: Conscientiousness, Extraversion, Neuroticism, Agreeableness, and Openness to Experience (Gender partialled out on first step)

[b] Hierarchical Regression: Gender entered on step 1; All five personality variables entered on step 2; Wonderlic Personnel test entered on step 3

[c] Hierarchical Regression: Gender removed on step 1; Wonderlic Personnel test entered on step 2; All personality variables entered in step 3.

[d] Stepwise regression: Independent variables entered: Wonderlic, Conscientiousness, Extraversion, Neuroticism, Agreeableness, and Openness to Experience (Gender partialled out on first step)

[e] Cumulative R^2 includes the effect of gender which was removed on the first step

[f] Standardized Beta value

Table 4

Regression Analyses Investigating Some Relationships Among the Five Factors of Personality and the Teamwork KSA Test

	R^2 Cumulative[a]	ΔR^2	b[b]
Dependent Variable: Conscientiousness			
Independent Variables (step 2)	.23	.19***	
Agreeableness			3.87***
Openness to Experience			.52
Neuroticism			-5.78***
Dependent Variable: Extraversion			
Independent Variables (step 2)	.36	.36***	
Agreeableness			.35***
Openness to Experience			.20***
Neuroticism			-.25***
Dependent Variable: KSA			
Independent Variable (step 2)	.07	.04***	
Conscientiousness			.20***
Dependent Variable: KSA			
Independent Variable (step 2)	.12	.09***	
Extraversion			.29***
Dependent Variable: KSA			
Independent Variables (Step 2):	.13	.10***	
Conscientiousness			.11*
Extraversion			.26***

*** p<.001 ** p<.01 * p<.05

Table 4 (Continued)

[a] Gender partialled out on the first step for all of the equations; R^2 Cumulative includes the variance accounted for by gender

[b] Standardized Beta

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