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Group differences in EI within a sample of black and white South Africans

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ABSTRACT

The Genos Emotional Intelligence Inventory (Genos EI) was examined psychometrically within a sample of Black ($N = 393$) and White ($N = 393$) South African (SA) employees. Internal consistency reliabilities were relatively high and similar across both Black and White samples, although there was a trend for lower reliabilities in the Black sample. Overall, the Black and White samples were associated with similar Genos EI means and standard deviations. Based on the differential item functioning (DIF) analyses, three of the 70 Genos EI items were found to be biased. However, the magnitude of the bias was considered negligible based on the DIF plots. Results are discussed in light of the small differences between Blacks and Whites on a measure of self-reported EI. It is suggested that some published criteria for evaluating practically significant DIF may be too conservative.

1. Introduction

Emotional intelligence (EI) has become a popular construct in individual differences psychology (Stough, Saklofske, & Parker, 2009). Furthermore, empirical research has accumulated to help support the validity of EI as an indicator of an important outcome variables such as well-being and job performance (Van Rooy & Viswesvaran, 2004). Increasingly, measures of EI are being used across a diverse range of cultures (Ekermans, 2009). Based upon the guidelines for assessment professionals, psychological assessments should not discriminate unjustifiably between racial or cultural groups (American Educational Research Association & National Council on Measurement in Education, 1999). Evidence for cultural bias between racial/cultural groups should be grounds for dismissing the appropriateness of the administration of the assessment in a culturally diverse context. In contrast to cultural bias, true construct related differences between groups (e.g., mean differences) may offer the opportunity to formulate theoretically important contributions to the academic literature (Berry, Poortinga, Segall, & Dasan, 2002). Thus, the purpose of this investigation was to compare two racial groups' (Black and White South Africans) scores on a self-report measure of EI (i.e., the Genos Emotional Intelligence Inventory; Gignac, 2008, in press; Palmer, Stough, Harmer, & Gignac, 2009). Specifically, Black and White South African (SA) samples were examined for possible differences in means, standard deviations, and internal consistency reliabilities. However, in order to help substantiate any interpretations of possible differences, as well as determining the appropriateness of administering Genos EI to a culturally diverse sample, the data were also examined for differential item functioning (DIF).

1.1. Approaches to the conceptualisation of EI

A well known taxonomy for the conceptual distinction in EI models (i.e. trait versus ability; Petrides, Pita, & Kokkinaki, 2007) is evident from recent research in this domain (Ferguson & Austin, in press; Johnson, Batey, & Holdsworth, 2009; Zeidner & Olnick-Shemesh, 2010; Petrides et al., 2010). According to Mayer, Roberts, and Barsade (2008), ability EI refers to a cognitive ability relevant to reasoning and problem solving in the emotion domain. The sampling domain of trait EI (also referred to as trait emotional self-efficacy; Petrides et al., 2007) comprises personality facets that are specifically related to affect. Tests of trait EI capture typical performance (Petrides & Furnham, 2001) on behavioural dispositions and self perceptions regarding an individual's ability to recognize, process, and utilize emotion-laden information (Petrides et al., 2007). The Genos EI inventory is best conceptualized as a self- and observer-report measure of typical EI performance, because all seven dimensions within the Genos EI model are directly relevant to an individual's typical application of an emotionally relevant skill or ability (Gignac, 2008).

1.2. Past group differences in EI research

To-date, only two empirical investigations appear to have examined self-report EI data for the possibility of racial differences. In one investigation, Van Rooy, Alonso, and Viswesvaran (2005)

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administered the Schutte emotional intelligence scale (Schutte EI; Schutte et al., 1998) to a sample of American university students and found Blacks scored higher than Whites on the total EI scale equal to a Cohen's *d* of .32. In contrast, Parker et al. (2005) found that Canadian aboriginal youth scored lower than Canadian non-aboriginal youth on the EQ-i:YV (Bar-On & Parker, 2000) equal to a Cohen's *d* of .46. Thus, the results of Van Rooy et al. (2005) and Parker et al. (2005) may be considered inconsistent, although the samples used in these two investigations may be suggested to be non-negligibly different. Specifically, Van Rooy et al.'s (2005) investigation was based on university students, whereas Parker et al.'s (2005) investigation was based on individuals living in rural Canadian communities.

As the existing empirical literature has yielded inconsistent findings, the need for additional empirical research appears warranted. Furthermore, because Van Rooy et al. (2005) and Parker et al. (2005) did not test the possibility that some of the survey EI items may be associated with DIF, it is difficult to conclude whether the observed Black/White mean differences may be interpreted substantively, or whether the mean differences have arisen due to item bias.

In addition to mean differences and DIF, possible group differences in internal consistencies may be considered important to investigate. Unfortunately, neither Van Rooy et al. (2005) nor Parker et al. (2005) reported reliabilities for the scale scores in their investigation, however, the factor loadings associated with the Parker et al. aboriginal sample suggested weaker internal consistency reliabilities, in comparison to the non-aboriginal sample. Based on the first author's calculations, the mean factor loadings associated with the non-aboriginal and aboriginal samples were .58 and .50, respectively. Thus, as factor loadings are directly related to the estimation of internal consistency reliability (see Gignac, Bates, & Jang, 2007, for example), it would appear that the aboriginal sample scores were associated with lower levels of internal consistency reliability, in comparison to the non-aboriginal sample.

In the related area of personality, Meiring, van de Vijver, Rothmann, and Barrick (2005) reported internal consistency reliabilities substantially lower in Black SA samples in comparison to White SAs who completed the 15FQ+ (Tyler, 2002). Typically, the 15FQ+ subscales were associated with internal consistency reliabilities .20 to .30 lower than the White SA sample. Thus, in light of the existing empirical research, it was hypothesized that a Black SA sample of Genos EI scores would be associated with lower levels of internal consistency reliability, in comparison to a White SA sample of Genos EI scores.

1.3. Item bias and differential item functioning

Should racial or cultural groups differ at the mean level, it does not necessarily imply that the inventory is biased against one of the particular groups. In order to assess such a possibility, one may conduct a differential item functioning (DIF) analysis (Wasserman & Bracken, 2003). In simple terms, a DIF analysis assesses whether group membership (e.g., race) predicts scores of a given item, controlling for individual differences in the total scale scores to which the item belongs. Stated alternatively, any two individuals (from two different groups) who achieve the same total score on a scale should have an equal probability of endorsing any particular item within that scale, when DIF is not observed. When DIF is tested and failed to be observed within an inventory, it helps support the justification for interpreting mean differences, substantively. Additionally, the absence of DIF helps support the use of an inventory within a culturally diverse sample (van de Vijver & Tanzer, 1998).

2. Method

2.1. Sample

The original sample consisted of 622 White and 401 Black employees who were born and residing in South Africa (SA). However, the two groups were associated with differences in education and age. Consequently, the Black and White samples were stratified in such a way as to have identical educational levels and negligible differences in age and gender. The final samples were 393 Blacks (mean age = 36.5, SD = 6.67; 55% male) and 393 Whites (mean age = 35.6, SD = 7.3; 56% male). The educational levels of the participants for both Black and White samples were: doctoral degree (0.3%), masters degree (11.5%), graduate diploma (3.8%), graduate certificate (2.0%), bachelor degree (32.3%), advanced diploma (5.1%), diploma (20.4%), certificate (10.7%), senior secondary (1.0%), grade 12 (11.5%), and grade 11 and below (1.5%).

2.2. Measure

Genos EI (Genos EI; Gignac, 2008) consists of seven subscales each of which comprises 10 unique items (therefore, 70 items in total; 29% negatively keyed). Each item is scored on a 5-point Likert scale from 'Almost Never' (1) to 'Almost Always' (5). The seven subscales are: (1) Emotional Self-Awareness (ESA; e.g., 'I fail to recognize how my feelings drive my behaviour at work.' (R)), (2) Emotional Expression (EE; e.g., 'When I get frustrated with something at work, I discuss my frustration appropriately.'), (3) Emotional Awareness of Others (EAO; e.g., 'I find it difficult to identify the things that motivate people at work.' (R)), (4) Emotional Reasoning (ER; e.g., 'I consider the way others may react to decisions when communicating.'), (5) Emotional Self-Management (ESM; e.g., 'I engage in activities that make me feel positive at work.'), (6) Emotional Management of Others (EMO; e.g., 'I am effective in helping others feel positive at work.'), and (7) Emotional Self-Control (ESC; e.g., 'I fail to control my temper at work.' (R)). Genos EI has been described as a measure of typical EI performance, as it measures the frequency with which individuals typically display emotionally intelligent behaviours in the workplace (Gignac, 2008; Palmer et al., 2009). Genos EI may be considered somewhat narrower in focus than other well-known trait EI measures (e.g., TEIQue; Petrides, Pérez-González, & Furnham, 2007), as it does not incorporate core facets of personality such as impulsivity and happiness, for example. Reliability and validity evidence for Genos EI scores can be found in Gignac (in press, 2008).

2.3. Procedure

Data were gathered across several emotional intelligence information sessions and research projects over approximately a two year period (mid 2007 to mid 2009). The Genos EI inventory is administered in an on-line format (typically, 20 min to complete).

2.4. Data analytic strategy

Black/White differences in internal consistency reliabilities (Cronbach's α) were tested for statistical significance with the Feldt test (1969). Practical significance in reliability coefficient differences were evaluated based upon a difference of |.05| or greater (e.g., .70 vs. .75). DIF was evaluated using an ordinal logistic regression (OLR) methodology, as recommended by Zumbo (1999). Zumbo (1999) approach is essentially a hierarchical multiple OLR, where a given item is the dependent variable and total scores on the subscale is entered at step 1, group membership is entered at step 2 (uniform DIF), and the interaction between subscale total

scores and group membership is entered at step 3 (non-uniform DIF). The statistical significance of uniform DIF is determined by performing a chi-square difference test between step 1 and step 2. The combination of uniform and non-uniform DIF is determined by performing a chi-square difference test between step 1 and step 3. In accordance with Zumbo (1999), the alpha level used to evaluate the chi-square difference values was adjusted for the large number of statistical tests performed. In this case, as there were 70 items tested for DIF, the alpha level used to demarcate a statistically significant effect was equal to .0007 (i.e., .05/70). Zumbo (1999) recommended that the significance of OLR DIF analyses be evaluated additionally from a practical significance perspective. Based upon an evaluation of the difference in R^2 values (ΔR^2) between step 1 and step 3 of the OLR DIF analysis, Jodoin and Gierl (2001) recommended the following interpretative guidelines: <.035 (negligible), .035 to .070 (moderate), and >.070 (large). In this investigation, only the R^2 difference between step 1 and step 3 will be calculated and reported in the first instance. In the event that a R^2 difference of .035 or greater is observed, the analysis will be carried further to partition the effect between uniform and non-uniform DIF. Additionally, to help interpret the nature of the DIF, a series of DIF plots were generated with TestGraf (Ramsay, 2000).

3. Results

3.1. Internal consistency reliability

As can be seen in Table 1, both the Black and White sample Total EI scores were associated with internal consistency reliabilities of approximately .94. Furthermore, with the exception of Emotional Reasoning (ER; Black sample), all of the subscale scores were associated with reliabilities in excess of .69. An examination of the corrected-item-total correlations (available upon request) revealed a poor item within the ER subscale (#10; $r_{\text{item-total}} = -.14$ and .05, for the Black and White samples, respectively). The Spearman rank correlation between the Black and White sample internal consistency reliabilities was equal to .95, indicating a substantial degree of congruence between the two samples with respect to internal consistency reliability. However, at the subscale level, there was a trend for the Black sample scores to be less reliable than the White sample scores. As can be seen in Table 1, the Black sample was associated with statistically significant lower levels of internal consistency reliability across five of the seven Genos EI subscales. However, from a practical significance perspective (difference greater than |.050|), only the ESM and ESC subscales evidenced meaningful differences in reliability.

3.2. Standard deviation and mean differences

Levene's test of homogeneity of variance failed to identify any statistically significant differences in the variances between the Black and White samples (see Table 1). With respect to the Genos EI means, statistically significant group differences were observed for the emotional self-management (ESM) and emotional management of other (EMO) subscales in favour of the Black sample. However, the differences corresponded to a small effect size (Cohen's $d = .26$ and $d = .14$, respectively; Cohen, 1992).

3.3. Differential item functioning

The combined uniform and non-uniform DIF chi-square difference tests and effect size estimates associated with all seventy Genos EI items are presented in Table 2. It can be observed that although several of the items exhibited DIF from a statistically significant perspective, only three of the items exhibited more than negligible DIF, based on Jodoin and Gierl's (2001) guidelines. Item 2 within the ESA subscale was only marginally above the negligible cut-off criterion at $\Delta R^2 = .036$. All of the DIF variance was uniform in nature (non-uniform ΔR^2 <.001). As can be seen in Fig. 1, Whites tended to score slightly higher than Blacks on item 2 ('I am aware of when I am feeling negative at work.') at a given level of ESA. However, the greatest discrepancy in the DIF plots amounted to only approximately .50 of an item score. Similarly, with respect to item 10 ('I focus solely on facts and technical information related to problems when trying to derive a solution.') within the ER subscale (see Fig. 2), the greatest discrepancy in the DIF plots also amounted to only approximately .50 of an item score. Some of the DIF variance associated with the ER item 10 was non-uniform in nature (non-uniform $\Delta R^2 < .013$). The unusual appearance of the DIF plot associated with this item is consistent with the poor item-total correlations reported above. Finally, in contrast to the other two items that exhibited DIF, Blacks scored higher on item 1 within the ESM subscale ('I take criticism from colleagues personally.'). Thus, the item was slightly biased against the White sample. However, the difference amounted to only approximately .25 of an item score (see Fig. 3). All of the DIF variance associated with ESM item 1 was uniform in nature (non-uniform $\Delta R^2 < .001$).

4. Discussion

To our knowledge, there have not been any DIF investigations in the area of EI. Consequently, comparisons with other empirical investigations are not possible. According to Jodoin and Gierl's (2001) guidelines, three items were identified to be associated with a moderate level of DIF. However, an examination of the corresponding DIF plots suggested that the bias amounted to between .25 and .50 of an item score. Considering that Genos EI subscales are associated with means of approximately 40, it is doubtful that such a degree of bias could have a consequential impact on the interpretation of Genos EI scores, either in research or applied settings. It will be noted that Zumbo (1999) suggested that non-negligible DIF may be observed in cases where $\Delta R^2 \geqslant .130$, which is

Table 1
Descriptive statistics associated with the Genos EI scale scores for Blacks ($N = 393$) and Whites ($N = 393$) in South Africa.

	Cronbach α		Feldt test			Means and SDs		Homogeneity		Mean differences		
	α_{Black}	α_{White}	$\lvert\Delta\alpha\rvert$	W	p	Black	White	$F_{(1784)}$	p	$t_{(1784)}$	p	d
Total EI	.943	.948	.005	.912	.182	286.29 (26.09)	284.35 (26.19)	.19	.660	-1.04	.298	.07
ESA	.766	.774	.008	.966	.365	42.67 (4.41)	42.76 (4.31)	.41	.525	.30	.762	-.02
EE	.734	.783	.049	.816	.022	40.37 (4.95)	40.08 (4.86)	.04	.833	-.83	.408	.06
EAO	.799	.834	.035	.826	.029	40.59 (4.68)	40.99 (4.70)	.05	.829	1.22	.224	-.09
ER	.673	.701	.028	.914	.188	39.27 (4.39)	39.58 (4.38)	.03	.863	1.01	.313	-.07
ESM	.701	.752	.051	.829	.032	40.82 (4.24)	39.66 (4.54)	1.24	.266	-3.70	.000	.26
EMO	.815	.847	.032	.827	.030	41.89 (4.75)	41.19 (4.91)	1.48	.224	-2.04	.042	.14
ESC	.693	.773	.080	.739	.001	40.70 (4.33)	40.09 (4.86)	3.00	.084	-1.84	.066	.13

Note: Levene's homogeneity F tests of and independent groups t-tests were associated with 1 and 784 df; ESA, Emotional Self-Awareness; EE, Emotional Expression; EAO, Emotional Awareness of Others; ER, Emotional Reasoning; ESM, Emotional Self-Management; EMO, Emotional Management of Others; ESC, Emotional Self-Control.

Table 2
Differential item functioning results: Genos EI subscales.

Item	ESA		EE		EAO		ER		ESM		EMO		ESC	
	$\Delta\chi^2$	ΔR^2	$\Delta\chi^2$	ΔR^2	$\Delta\chi^2$	ΔR^2	$\Delta\chi^2$	ΔR^2	$\Delta\chi^2$	ΔR^2	$\Delta\chi^2$	ΔR^2	$\Delta\chi^2$	ΔR^2
1	8.60	.007	.55	<.001	1.11	.001	.26	<.001	40.67*	.041	10.58	.014	6.13	.015
2	34.31*	.036	1.13	<.001	3.84	.003	5.48	.006	1.96	.004	.32	<.001	1.83	.003
3	2.85	.003	4.47	.007	1.71	.002	2.49	.005	.34	<.001	9.39	.008	5.75	.008
4	6.02	.006	5.69	.005	3.70	.002	6.55	.008	6.58	.007	12.15	.015	4.36	.007
5	3.54	.002	1.87	.002	.13	<.001	22.97*	.023	4.49	.005	12.24	.012	1.57	.001
6	16.69*	.020	7.97	.009	2.21	.002	.91	<.001	1.23	.003	3.06	.002	12.06	.010
7	19.58*	.018	3.51	.004	19.29*	.031	11.88	.015	1.26	<.001	.13	<.001	6.01	.006
8	1.51	.002	1.09	<.001	4.85	.004	3.20	.002	.58	<.001	.59	<.001	8.17	.010
9	.48	<.001	2.59	.002	12.15	.014	4.79	.006	3.68	.004	4.06	.004	15.55*	.016
10	2.28	.002	24.99*	.016	.28	<.001	47.61*	.058	2.59	.002	.70	<.001	.06	<.001

Note. Complete results associated with each step of the DIF analyses have been omitted (available upon request), see Table 1 for full subscale names.
* $p < .0007$ (i.e., .05/70 = .0007).

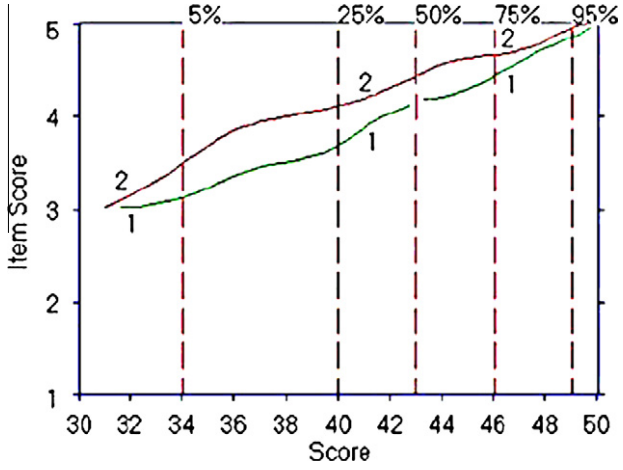

Fig. 1. DIF plot for item 2 of Emotional Self-Awareness (Black = 1; White = 2).

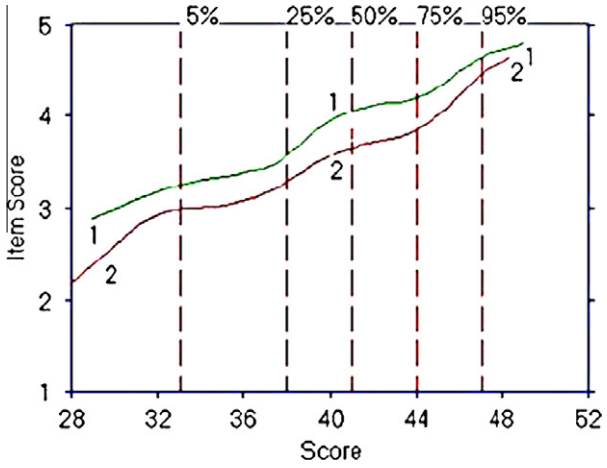

Fig. 3. DIF plot for item 1 of Emotional Self-Management (Black = 1; White = 2).

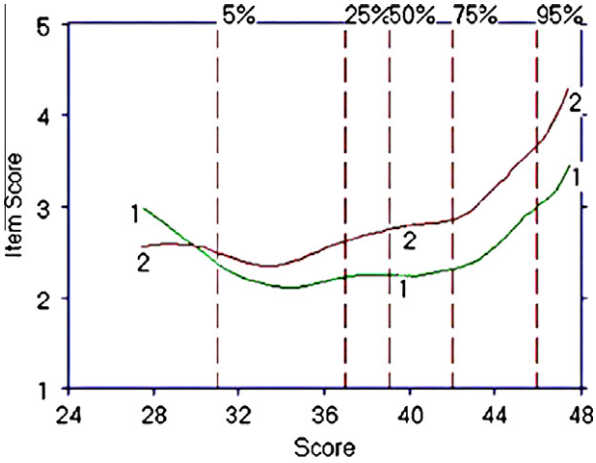

Fig. 2. DIF plot for item 10 of Emotional Reasoning (Black = 1; White = 2).

substantially larger than Jodoin and Gierl's (2001) recommendation of $\Delta R^2 \geqslant .035$ for moderate DIF. Consequently, based on the DIF plots reported in this investigation, as well as Zumbo's (1999) initial recommendation, perhaps Jodoin and Gierl's (2001) recommendations for the practical interpretation of DIF are excessively conservative for multiple-item scales. In light of the above, it may be suggested that Genos EI subscale and Total EI scores are not culturally biased against Whites or Blacks in SA, in a meaningful way. Irrespective of the above, however, item 10 within the ER subscale, which was associated with the most significant DIF (ΔR^2 = .058), should nonetheless be revised, as it has demonstrated relatively poor psychometric properties in a previous investigation (e.g., Gignac, in press), as well as this one.

The results of this investigation partially replicated the results reported in Van Rooy et al. (2005), as two subscales (ESM and EMO), but not total EI, evidenced a statistically significant effect in favour of Blacks. However, the mean differences from a practical significant perspective were relatively negligible, based on Cohen's (1992) guidelines. To understand further the slightness of the effect between the two groups on the ESM subscale, consider that on the 5-point Likert scale upon which Genos EI items are rated, Blacks scored an average of 4.1 and Whites scored 4.0. Thus, perhaps the main conclusion with respect to Genos EI means is that Blacks and Whites score similarly across all scales.

The finding that Blacks and Whites score similarly on a measure of EI may be viewed as surprising, considering that Blacks have been found consistently to score lower than Whites on traditional measures of intellectual intelligence (Neisser et al., 1996). It is important to emphasize, however, that Genos EI is measure of typical EI performance, rather than maximal EI performance. Typical performance scores and maximal performance scores in the broader *I*/*O* literature have been suggested to be only modestly to moderately related (e.g., $r = .15$ to $r = .30$; Sackett, Zedeck, & Fogli, 1988). Thus, the non-convergence between EI and IQ with respect to Black/White differences is not necessarily theoretically anomalous. It would be interesting to determine whether there are mean-

ingful Genos EI differences between Blacks and Whites based on the observer-report method of survey measurement (i.e., multi-rater). It would also be interesting to determine whether Black employees and White employees rate each similarly or with respect to typical EI performance.

In contrast to the DIF and mean comparison results, there did appear to be a meaningful trend for Black sample reliabilities to be somewhat lower than White sample reliabilities. Although no difference was observed for the total Genos EI scale, reliability estimates of .69 and .77 were observed on the ESC scale for Blacks and Whites, respectively. These findings correspond to the results of Ekermans (2009), based on the SUEIT (the predecessor of Genos EI). Also, Meiring et al. (2005) reported reliability estimates in non-Whites that were typically .20 to .30 lower than Whites on a measure of personality (15FQ+; Tyler, 2002). It is possible that non-Whites in South Africa may not possess as great a familiarity with the English language as Whites, which may be expected to affect internal consistency reliability, adversely. However, Genos EI items have been rated at seventh grade English reading level (Gignac, 2008), which most adult SAs in the workforce should be able to manage. Furthermore, in this investigation, both Black and White samples were stratified to ensure comparable levels of educational attainment. Thus, explanations based on group reading comprehension differences do not seem plausible. Overall, the reliabilities associated with the subscales in both Black and White samples were arguably sufficiently high for the purposes of research, learning, and development. At approximately .94, the total EI scores were arguably sufficiently high for recruitment and selection purposes. Of course, additional validity research would have to be provided to help support further use of Genos EI in SA, although it will be noted that some preliminary research has begun to accumulate to this effect (e.g., Brand, 2007; Furnell, 2008).

It should be noted that, in this sample, culture may not have had a pronounced effect, as the Black respondents may be considered to have been largely acculturated into Western culture (i.e., English speaking, relatively well educated, and working within a modern/industrialised environment). Thus, the results reported in this investigation may be considered limited from that perspective. An additional limitation associated with this investigation is that DIF was examined using a single approach. Alternative statistical methodologies may identify more substantial DIF effects than those reported in this investigation. Future research may consider examining the issue of group differences in EI from the perspective of raters, as opposed to self-reports.

In summary, it would appear that Black and White SAs score similarly on a self-report measure of typical EI performance. Furthermore, based on the DIF analyses, the Genos EI inventory does not appear to be meaningfully culturally biased against relatively well-educated, English speaking Blacks or Whites in SA. Thus, researchers and practitioners may consider administering Genos EI in SA, assuming the validity research reported in Gignac (2008) and Palmer et al. (2009) would also apply within the SA context. Of course, researchers are nonetheless encouraged to gather additional validity evidence directly relevant to the SA context.

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