



General mental ability moderates the link between confidence and integrity test scores



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ABSTRACT

The present study examined whether general mental ability (GMA) moderated the link between confidence and integrity test scores. Participants were 477 Australian adults who completed an online survey that gauged GMA, confidence in the accuracy of responses to GMA items, and the Hilson Safety/Security Risk Inventory as a measure of integrity. Results indicated that confidence was a negative predictor of both Safety Risk and Lack of Hostility/Anger Control. An interaction effect was also found in that overconfident individuals (i.e., low GMA and high confidence) were less likely to report more aggression and hostility on the job. The implications of the findings are discussed.

1. Introduction

1.1. Integrity tests

Integrity tests have been utilized on millions of people in the USA and internationally (Berry, Sackett, & Wiemann, 2007). Integrity tests measure a range of constructs, including responsibility, ongoing job commitment, work ethics, dependability, consistency, moral reasoning, and energy levels (O'Bannon, Goldinger, & Appleby, 1989). Integrity tests are a predominant predictor of important individual workplace outcomes (Ones, Viswesvaran, & Schmidt, 1993), including general job performance, training performance, involuntary turnover, and counterproductive work behaviours (CWBs) (Iddekinge, Roth, & Raymark, 2012).

Although the research on integrity tests has focused on CWBs (Iddekinge et al., 2012; Ones et al., 1993), an emerging body of research has investigated the links with safety attitudes and behaviours more generally. For example, Oliver, Shafiro, Bullard, and Thomas (2012) employees that had not been screened with an integrity test were 3.7 times more likely to file a compensation claim associated with an accident at work. In a sample of 680 job incumbents, supervisor-assessed engagement in safety behaviours was moderately and positively predicted by integrity, $\beta = 0.295$ (Casillas, Robbins, McKinniss, Postlethwaite, & Oh, 2009). Because integrity tests tap personality traits associated with Conscientiousness, the tendency to be organised, playful, reliable, responsible, and thorough (McCrae & John, 1992), they help to screen out individuals most likely to experience avoidable

accidents in the workplace (Ones & Viswesvaran, 2001).

1.2. Confidence and overconfidence

Cognitive biases, such as confidence or overconfidence, are ubiquitous in reports on accidents, incidents, collisions, and disasters in the workplace (Murata, Nakamura, & Karwowski, 2015). Confidence is defined by an individual's certainty that their judgments are accurate and are typically yoked to a cognitive ability test, such that individuals are asked how confident they are in the accuracy of the just-provided response (Stankov, 1999). The predictive value of confidence also appears to generalise beyond the test it was administered in (Kleitman & Stankov, 2001). That is, overconfidence in one task (i.e., high confidence relative to ability) is likely to reflect overconfidence in other tasks (Stankov, Morony, & Lee, 2014).

It has been suggested that accurate knowledge monitoring, such as that represented by confidence (i.e., metacognitive monitoring), is fundamental in order to employ more complex metacognitive processes (e.g., planning and decision making) (Was, 2014). For example, research suggests that students with a better calibration between GMA and confidence (i.e., better metacognitive monitoring) exhibited larger gains in academic performance (Rinne & Mazzocco, 2014). Furthermore, individuals exhibiting poor metacognitive monitoring (e.g., a level of confidence too high for associated ability; overconfidence) tend to make quick decisions based on minimal information, increasing the risk that they would incorrectly treat their patients in a fictitious medical task (Jackson & Kleitman, 2014).

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Overconfidence might also be relevant to the measurement of integrity. For example, research suggests that overconfident individuals tend to overestimate their own ability and focus on information that supports this inaccurate perception (Koriat, Lichtenstein, & Fischhoff, 1980). This overestimation may manifest behaviourally as ignoring potential problems or negative outcomes, and engagement in risk-taking behaviours (Hoorens, 1994). Since overconfidence is associated with a failure to see deficiencies in ability, preparatory behaviours may be neglected (Buehler, Griffin, & Ross, 1994) and predicting future outcomes may be overly optimistic/positive (Dunning, Heath, & Suls, 2004). In other words, an individual's ability might be differentially linked to an individual's integrity based on their confidence.

1.3. Present study and aims

Despite the evidence suggesting a role for overconfidence in workplace safety (Aksorn & Hadikusumo, 2007; Berner & Graber, 2008), there has been limited investigation of its association with other predictors of safety. Establishing a link between overconfidence, an indicator of decision-making biases, and integrity tests, provides evidence that overconfidence might also have utility in predicting negative and risky workplace behaviours (e.g., CWBs). Establishing this link between overconfidence and integrity tests could subsequently have implications for how organisations identify individuals at risk of workplace deviance and safety violations. The present study therefore sought to examine the association between overconfidence and an overt integrity test measure. We selected an overt integrity test because research evidence suggests they predict more specific rule violations than covert tests (Bernardin & Cooke, 1993). Important demographic variables (e.g., age) were controlled for in the analyses due to their demonstrable relationship with confidence miscalibration (Stankov & Lee, 2008). Based on the research reviewed here, we hypothesise that higher levels of confidence, in combination with low GMA (i.e., overconfidence), will be associated with lower integrity test scores.

2. Method

2.1. Participants

Participants were 477 adults applying for jobs as security guards with an Australian organisation. The sample was predominantly male, Caucasian and had English as their first language. The sample was evenly distributed across educational levels. Demographic information for the participants is displayed in Table 1.

Table 1
Participant demographics ($N = 477$).

Measure	<i>N</i>	%
Age (years)		40.92 ± 11.00
Males ^a	426	92.8
English as first language	336	70.4
Ethnicity ^a		
White	262	61.2
Asian	37	8.6
Pacific islander	15	3.5
Indo-Chinese	2	0.5
Aboriginal	13	3.0
Other	99	23.2
Education ^a		
Up to 10 years schooling	149	34.7
Up to 12 years schooling	104	24.2
Non-degree certificate/diploma	111	25.9
Degree	65	15.2

^a Data were missing for some participants, $N = 18$ for gender, $N = 49$ for ethnicity, and $N = 48$ for education.

2.2. Instruments

The abilities General Mental Ability - 3 (GMA-3) provided three core tests of cognitive abilities: Swaps, Vocabulary, and Numerical Operations (described below). These tests measure some of the key cognitive abilities described by the theory of fluid and crystallized intelligence (abilities Technical Monograph). All items included within the battery had cut-off times. Scores from each of the three core tests (described below) were combined using an algorithm weighting each test by its loading on a single factor to give an overall total GMA score (GMA-T).

2.2.1. Test of fluid ability (GMA-S) - Swaps

This was a 20-item test of fluid ability that involved working memory. Test-takers were shown a set of three pictures and were given an instruction about swapping the order of the pictures (e.g., “Swap 2 and 3”). They were then shown an answer screen, which included the same three pictures in various orders. Participants selected the option that presented the correct sequence of pictures after the swap had been made. Test items ranged between 1 and 4 swaps, with item complexity increasing as more swaps were required. The internal reliability of this test in this study was $\alpha = 0.83$.

2.2.2. Test of crystallized ability (GMA-V) - Vocabulary

This was a 30-item test of word knowledge that measured crystallized ability. A word was displayed on the screen and four possible synonyms were shown below it. Test-takers were instructed to select the word that meant the same as the target word from among the four options. The internal reliability on this test was $\alpha = 0.77$.

2.2.3. Test of quantitative knowledge (GMA-N) - Numerical Operations

This 25-item test consisted of mathematical questions that requested the participants to solve by using addition, subtraction, division and multiplication (without calculator), and select the correct solution to the problem from the four possible options below it. The Numerical Operations test had an internal reliability of $\alpha = 0.84$.

2.2.4. Confidence

Confidence was measured by embedding survey questions into each of the ability tests. After each test item, participants were asked to rate how confident they were that they answered the preceding question correctly. The response options ranged between 25% confidence (consistent with the chance of guessing the correct answer) and 100% confidence. Consistent with the evidence indicating that Confidence forms a single factor regardless of the cognitive test it is yoked to (e.g., Stankov, Kleitman, & Jackson, 2015) an average Confidence score was calculated across all three tests. The internal reliability of the Confidence composite was $\alpha = 0.98$.

2.2.5. The Hilson Safety/Security Risk Inventory (HSRI; Inwald, 1995)

Integrity test scores were derived from the HSRI, a 178-item true-false questionnaire designed to aid organisations in selecting potential employees who will be working in situations in which personal and/or mechanical safety practices are required. The HSRI aids in the identification of individuals who might be prone to unsafe work practices, and those who tend to act impulsively in emergency situations. It contains three key measures: Safety Risk (higher scores reflect a higher level of safety risk), Lack of Hostility/Anger Control (higher scores reflect a greater lack of, or less, hostility/anger control), and Lack of Preparation Concerns (higher scores reflect a greater lack of, or less, preparation concerns). The internal reliability of each scale was reported in the HSRI Technical Manual as 0.83, 0.87, and 0.62 respectively (Inwald, 1995). In addition, the mean (SD) of the GMA subtests Swaps, Vocabulary and Numerical Operations reported in the HSRI Technical Manual was 66.28 (20.62), 72.03 (13.59), and 74.85 (16.18) respectively.

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