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Richard K. Wagner

RELATED ENTRIES

INTELLIGENCE ASSESSMENT (GENERAL), PRACTICAL INTELLIGENCE: ITS MEASUREMENT, COGNITIVE ABILITY: MULTIPLE COGNITIVE ABILITIES

P

PRACTICAL INTELLIGENCE: ITS MEASUREMENT

INTRODUCTION

Practical intelligence is one among various multiple intelligences that have been proposed in recent years. Sternberg and his research team (Sternberg et al., 2000: xi-xii) are the only researchers, however, to have undertaken a systemic programme to measure practical intelligence and to assess its criterion-related validity. They claim to have shown that it is not only independent of the well-documented general intelligence factor, *g* (Carroll, 1993; Jensen, 1998), but also 'arguably ... a better predictor of success' in life.

CONSTRUCTS ASSESSED

Sternberg and his colleagues do not actually measure practical intelligence, but what they refer to as its 'important aspect', tacit knowledge.

Practical Intelligence

Sternberg and his colleagues define practical intelligence as 'the ability to solve real-world everyday problems' and, most broadly, 'the ability to adapt to, shape, and select everyday environments'. It is 'what most people call common sense' (Sternberg et al., 2000: xi, 97-98).

Although *g* is known to be a very general ability (Carroll, 1993), Sternberg and his colleagues argue that there exists a second, separate general intelligence – a practical intelligence – because adapting to the real-world requires practical action but IQ tests measure only an ‘inert’, ‘academic’ ability. More specifically, they argue that there are two distinct spheres of human activity. The ‘academic’ sphere of activity is said to pose problems that are formulated by other people, well-defined, and complete; possess only a single correct answer and method of obtaining that answer; and are disembedded from ordinary experience and are of little or no intrinsic interest – in other words, the stereotype of an IQ test. In contrast, ‘practical’ problems require problem recognition and formulation; are ill-defined; require information seeking; possess multiple acceptable solutions; allow multiple paths to solution; are embedded in and require prior everyday experience; and require motivation and personal involvement.

This academic–practical distinction in the kinds of *tasks* that people confront in life is meant to establish a *prima facie* case that *g* is not really a general ability, because there must be different intelligences for the two kinds of tasks. Although this distinction among tasks may be useful for some purposes, it cannot moot a century of research showing that higher levels of *g* actually do provide individuals big practical advantages in everyday life, from level of job and income attained to health and longevity (Gottfredson, 2002, in press b; Schmidt & Hunter, 1998). In fact, higher levels of *g* are especially advantageous when tasks ‘require problem recognition and formulation, are ill-defined, and require information seeking’, attributes describing the tasks that the Sternberg team assigns to the ‘practical’ sphere of life.

Sternberg and his colleagues draw a second distinction to support the viability of their practical intelligence construct, namely that there are academic and practical forms of *knowledge*. This is consistent with their ‘knowledge-based’ view of intelligence. This view minimizes the evidence on *g*’s heritability and portrays the *g* factor mostly as a cultural artefact created by Western schools teaching some skills and knowledge rather than others, presumably to some students and not others (Gottfredson, in press a).

Tacit Knowledge

Sternberg et al.’s (2000) emphasis on distinct forms of knowledge leads directly to the most important construct in their measurement programme – tacit knowledge. In their view, the general intelligence factor *g* reflects the ‘facile acquisition of formal *academic* knowledge’ whereas practical intelligence reflects the ‘facile acquisition and use of *tacit* knowledge’ (Sternberg et al., 1995: 916, emphasis added).

Tacit knowledge is ‘experience-based knowledge relevant to solving practical problems’ (Sternberg et al., 2000: 104–105). It is therefore highly context-specific procedural knowledge: ‘tacit knowledge is always wedded to particular uses in particular situations or in classes of situations’ (Sternberg et al., 1995: 917). It is acquired on one’s own with little support from the social environment, is often not verbalized, and is useful in attaining personal goals. They describe it more colloquially as ‘practical know-how’, ‘knowing the ropes’, and ‘street smarts’.

Because tacit knowledge is the *untaught* fraction of procedural or ‘practical’ expertise, it would seem to be much narrower than the construct it is meant to measure – the ‘ability to solve real-world everyday problems [and] ... adapt to, shape, and select everyday environments’. Sternberg et al. (2000: xi) justify focusing their measurement programme on tacit knowledge by stating that it is ‘one particularly important aspect’ of practical intelligence. They do not say what the other aspects might be.

ASSESSMENT INSTRUMENTS

Tests of Tacit Knowledge

Because tacit knowledge is highly specific, separate tests of tacit knowledge are required for every setting. Sternberg and his colleagues have focused on tacit knowledge for jobs, and have developed inventories for academic psychology, management, sales, and three levels of Army officers. The test of Tacit Knowledge in Management (TKIM) was once available from the Psychological Corporation, but no tacit knowledge test is currently available commercially. See Wagner (1987) for examples of items on the academic psychology test and early versions of the management test, appendices in

Sternberg et al. (2000) for copies of the sales (TKIS) and most recent management test (TKIM), and Hedlund et al. (1998) for the tests of military leadership at three levels (TKML-platoon leader, TKML-company commander, and TKML-battalion commander).

Sternberg et al. (2000) mention only one tacit knowledge test for a non-work setting: a test for Kenyan children's knowledge of herbal remedies (Sternberg, Nokes, Geissler, Prince, Okatcha, Bundy & Grigorenko, 2001). There are no criterion-related studies with this test.

Tacit job knowledge tests generally pose 7–19 problem-solving scenarios that job incumbents have verified as important in their occupation (platoon leader and so on). Each scenario lists 6–16 potential actions to take, all of which respondents rate on a 7- or 9-point scale for either quality or importance. For example, one scenario on the inventory for academic psychology asks respondents to rank the likely effectiveness of different strategies for '[becoming] one of the top people in your field and [getting] tenure in your department' – for example, 'improve ... your teaching', 'write a grant proposal', and so on (Wagner & Sternberg, 1985: 440). Each tacit knowledge test generally has several subscales: for example, the academic psychology test contains scales on managing self, others, and career.

Only the sales test is scored for accuracy of response. The others are scored for similarity of respondents' answers to those of incumbents designated as experts. Tacit knowledge tests are therefore scored more like interest inventories than ability tests.

Internal consistency reliabilities are reported for about half the studies (see Table 1). Of those reported, the alphas range from 0.66 to 0.85 for total scores.

Sternberg Triarchic Ability Test (STAT)

Sternberg has also developed a test intended to measure academic, creative, and practical abilities, primarily in academic settings (e.g. Sternberg, Castejon, Prieto, Hautamaki & Grigorenko, in press). I will not discuss it here because it is currently being revised, perhaps because its three scales all appear to measure *g* more than anything else (Brody, in press).

RESEARCH

Table 1 lists all six criterion-related studies that Sternberg et al. (2000) summarize, plus one other (Colonia-Willner, 1998) they bring up only in the context of mental ageing. As shown in Table 1, the seven studies include 12 samples of workers in five moderately high-level occupations.

General Factor of Practical Intelligence

The way to determine whether a general factor of practical intelligence exists is to factor analyse a large diverse set of tacit knowledge tests. Sternberg and his colleagues lack such data because they have administered two tacit knowledge tests to only three samples of Army officers and one sample of Yale undergraduates. Sternberg et al. (2000) nonetheless concluded that tacit knowledge reflects a 'domain-general' ability, based largely on the finding that performance on the psychology and management tests correlated 0.58 in the sample of 66 Yale undergraduates (Wagner, 1987). Table 1 shows that the management and leadership tests correlated only –0.06, 0.32, and 0.36 in the three samples of Army officers. Sternberg et al. (2000) interpreted the latter results as evidence for the 'domain-specificity' of tacit knowledge tests.

Independence of Tacit Knowledge and *g*

Because there is no evidence for a general factor of practical intelligence, there can be no evidence yet that any such factor is independent of *g*. The Sternberg team bases its claim for the independence of practical intelligence from *g* on the low correlations of *individual* tacit knowledge tests with scores on some IQ test or subscale (e.g. Shipley Institute for Living Scale; Concept Mastery Test Analogies Subscale). Table 1 presents the correlations for workers (see Gottfredson, in press a, for the results for students). The relevant correlations from the four samples are low (0.09 to 0.30), but interpretation is clouded by the fact that the average IQ in these samples was highly restricted in range (for example, the IQ of the 45 business managers in leadership training averaged IQ 120, which is the 90th percentile).

Table 1. Criterion-related studies of job tacit knowledge

Publication/report	Sample	N	Test of tacit knowledge	Alpha reliability	Job outcome criteria	N-weighted r's:		
						TK	IQ	TK
Wagner & Sternberg (1985)	Psychology professors (USA)	54	Psychology	0.77	N of publications, citations, conferences attended, papers presented; dept. scholarly rank	0.29	-	-
	Business managers (USA)	54	Management	0.68	Level of company prestige, salary, job title; N of employees supervised	0.26	-	-
	Bank managers (USA)	29	Management	?	% salary increase; rated performance in personnel, new business, policy, and overall	0.42	-	-
Wagner (1987)	Psychology professors (USA)	91	Psychology	≥0.74	N of publications, citations, papers presented; dept. scholarly rank	0.35	-	-
	Business managers (USA)	64	Management	≥0.79	Level of company prestige, salary	0.13	-	-
Wagner & Sternberg (1990)	Business managers (USA)	45	Management	?	2 small-group managerial simulations	0.61	0.38	0.14
Williams & Sternberg (undated)	Business managers (USA)	?	Management	?	Level of position, compensation, age-controlled compensation, satisfaction	0.34	-	-
Wagner et al. (1999)	Life insurance salespeople (USA)	48	Sales	0.82 ^a	Sales volume and premiums in two years; quality awards	0.22	-	-
Colonia-Willner (1998)	Bank managers (Brazil)	157	Management	0.85	Salary, N of people supervised, rated performance; composite index	0.06	-0.04	0.30
Hedlund et al. (1998)	Platoon leaders (US Army)	368	Platoon leadership	0.69	3 peer and 3 supervisor ratings of leadership	0.10	0.05	0.10
	Company commanders (US Army)	163	Company leadership	?	Same	0.02	0.09	0.09
	Battalion commanders (US Army)	31	Management	?	3 subordinate, 3 peer, and 3 supervisor ratings of leadership	0.09	-0.09	0.19
			Battalion leadership	0.66	Same	-0.09	0.15	0.09
			Management	?	3 subordinate and 3 peer ratings of leadership	0.10	0.13	0.09
					Same	0.13	0.16	0.16

? = Data not reported.

- = Data not collected.

^aData include 48 students.

Note: All tacit knowledge scales have been reflected here so that better scores (smaller deviations from the experts) yield positive correlations.

Criterion-Related Validity of Tacit Knowledge

Table 1 summarizes the criterion-related validities for total scores on the tacit knowledge tests. All are concurrent validities and none is corrected for unreliability or restriction in range. The table reveals a diverse mix of job outcome criteria, ranging from careerist (e.g. salary, job title, job satisfaction) to quality of performance on the job (e.g. sales awards, rated leadership), the former being of interest mostly to workers and the latter mostly to employers. The mean criterion correlations are substantial – generally around 0.3 – for the five civilian studies that Sternberg et al. (2000) highlight (the first five in Table 1), although the results for specific criteria (not shown) often do not replicate across parallel studies (Gottfredson, in press a). More importantly, the criterion validities are near zero in the two studies whose results Sternberg et al. (2000) either do not report (0.06; Colonia-Willner, 1998) or say little about (–0.09, 0.02, 0.09; Hedlund et al., 1998). The former is the largest civilian study, and the latter is the largest, most carefully executed, and least careerist-oriented study of the entire set of seven.

Criterion-Related Validity of Tacit Knowledge versus IQ

Sternberg et al. (2000) base their claim that practical intelligence is arguably a better predictor 'of success' on two facts. The first is that tacit knowledge correlated 0.61 but IQ only 0.38 with (simulated) performance in their study of 45 managers in leadership training. They do not mention the negative results from the Colonia-Willner (1998) study – 0.06 for tacit knowledge versus –0.04 for IQ. Again, they say next to nothing about the results from the unpublished study of Army officers, where mean criterion correlations were low (–0.09 to 0.13) and virtually identical for both IQ and tacit knowledge. The second fact to which they appeal is that the criterion correlations they highlight for tacit knowledge are about twice as large as the average correlation for IQ they say is reported in the job performance literature. As detailed elsewhere, however, they grossly overstated their own results while grossly understating the field's estimates for *g*. A careful accounting shows exactly the opposite pattern (Gottfredson, in press a).

Summary

No assessment has yet been shown to measure a general factor of practical intelligence. Tests of tacit knowledge for specific occupations have yielded moderate correlations with outcome criteria in six samples of incumbents but not in six others. Tests of *g*, which are not targeted to any occupation, correlated equally well (or poorly) with performance outcomes in four samples, worse in one, and better in a sixth sample – all of which were restricted in range on intelligence. There are no data on the value of tacit knowledge in low- to moderate-difficulty occupations or in non-work settings.

FUTURE PERSPECTIVES AND CONCLUSIONS

Considerably more research will be needed to establish whether practical intelligence is a viable construct. Should a general factor of practical intelligence be identified in the future, tests measuring it must be factor analysed together with traditional mental tests in order to determine whether the practical intelligence factor is, in fact, independent of the *g* factor and, if not, where it fits into the *g*-topped hierarchical model of human intelligence.

Although Sternberg and his colleagues describe tacit knowledge as an important aspect of practical intelligence, it seems unlikely that tacit knowledge tests could individually be good measures of any general ability factor because, by design, each is highly setting-specific and experience-based. IQ tests succeed in measuring a context- and content-free general ability by stripping test items of all need for specialized knowledge and experience. Tacit knowledge tests do just the opposite.

The very specificity that makes tacit knowledge tests poor candidates for measuring a general ability might make them good candidates for measuring important but neglected forms of specialized knowledge. Because their items generally have no objectively correct answers, however, research needs to verify that the tests actually do measure knowledge rather than some non-intellectual attribute (say, a zeal for self-promotion).

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Linda S. Gottfredson

RELATED ENTRIES

INTELLIGENCE ASSESSMENT (GENERAL), COGNITIVE ABILITY: MULTIPLE COGNITIVE ABILITIES, PRACTICAL INTELLIGENCE: CONCEPTUAL ASPECTS

P PREDICTION (GENERAL)

INTRODUCTION

If prediction is a statement about an unknown and uncertain event (Ledolter, 1986) then many activities in the domain of psychological assessment can be characterized and discussed from this perspective. Thus, a nosological

classification usually has implications for the values of variables not used for this classification, and leads to expectations of future behaviour of a client. Deciding on an intervention is related to a prediction of success; the selection and use of assessment instruments is equivalent to the choice of predictors.